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PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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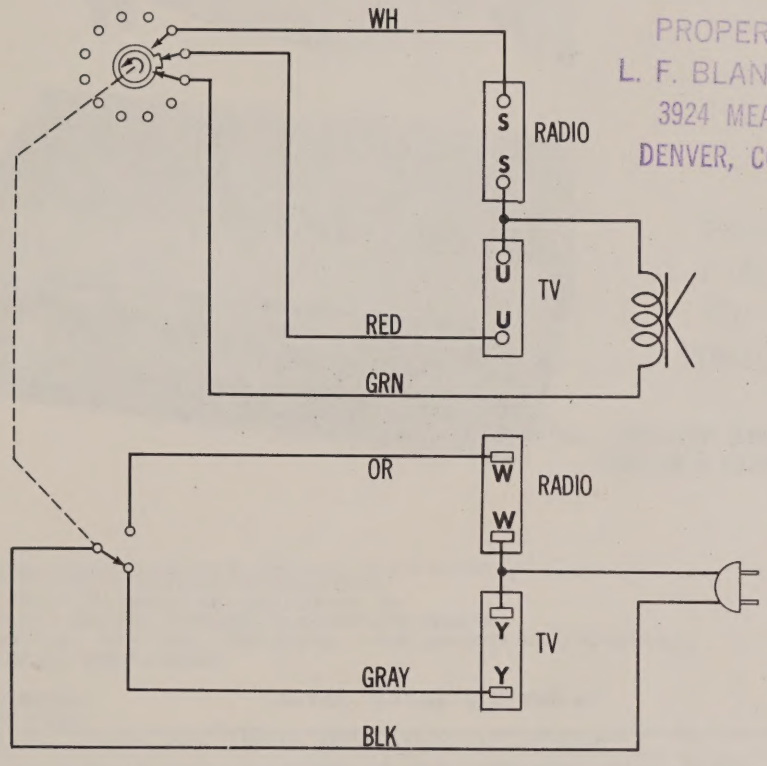
SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 10 IN SET 207

Ch.100.202-1
100.210-2

Silvertone model 3195 uses television chassis 100.210-2 and radio chassis 100.202-1.

Chassis 100.210-2 is electrically identical to chassis 100.210, covered in Photofact Folder 10 Set 207, and chassis 100.202-1 is identical to chassis 100.202, covered in Photofact Folder 10, Set 162, except a common 12" speaker (part #W505512) is used. A Radio-TV selector switch and junction box was added to switch the speaker and AC power line from television to radio-phono operation. A schematic of the junction box and switch is given below.



RADIO-TV SELECTOR SWITCH
SHOWN IN TV POSITION

PROPERTY OF
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In later production of radio chassis 100.202-1, the following changes were made.

Ch.100.202-1
Coded
"Series A"

In chassis coded "Series A" a .01MFD capacitor was added from the red-black lead of the primary of the power transformer, T1, to ground. This change was made to reduce hum.

Ch.100.202-1
Coded
"Series B"

In chassis coded "Series B" capacitor C17 was changed from .01MFD to .003MFD. This change was made to improve tracking.

SILVERTONE MODEL 3195 (Ch. 100.210-2 & Radio Ch. 100.202-1)

PRODUCTION CHANGES
BULLETIN 91

PRODUCTION CHANGES
BULLETIN 91

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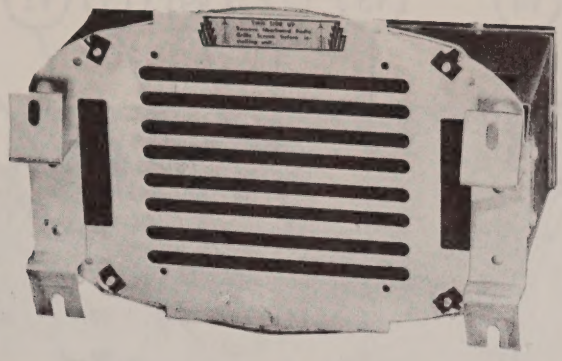
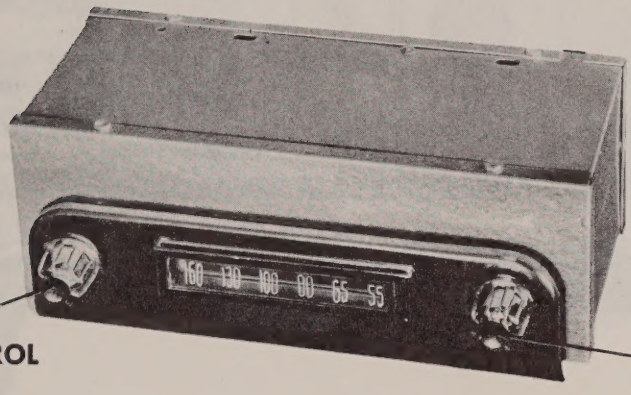
AIRLINE
MODEL 61-6793





TUNING CONTROL

ON-OFF SWITCH
VOLUME CONTROL

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

AIRLINE
MODEL 61-6793

TRADE NAME	Airline Model 61-6793 (For 1953 Chevrolet Automobiles)
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Ill.
TYPE SET	Battery Operated Custom-built Automobile Superheterodyne Receiver
TUBES (Six)	Types 6BA6 RF Amp., 6BE6 Conv., 6BA6 IF Amp., 6AT6 (or) 6AV6 Det.-AVC-AF Amp., 6V6GT Audio Output, 6X5GT Rectifier
POWER SUPPLY	6 Volt Storage Battery — RATING 5.3 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	538-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	68MMF	High side to antenna terminal. Low side to chassis.	1600KC	"	"	A5	"
3.	"	"	1400KC	Tune to 1400KC signal	"	A6, A7	"
4.	"	"	600KC	Tune to 600KC signal	"	A8, A9	"
5.	Repeat step 3.						

With tuning gang fully closed set pointer to left edge of "55" on the dial.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RTMA BASE TYPE	NOTES
		AIRLINE PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	6BA6	6BA6	7BK	
V2	Converter	6BE6	6BE6	7CH	
V3	IF Amplifier	6BA6	6BA6	7BK	
V4A	Det.-AVC-AF Amp.	6AT6	6AT6	7BT	
B	Det.-AVC-AF Amp.	6AV6	6AV6	7BT	
V5	Audio Output	6V6GT	6V6GT	7S	
V6	Rectifier	6X5GT	6X5GT	6S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	AIRLINE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■20	350	CE-86	AFH3-109		CO80		FP345.8	TVL-3678	
B	▲20	350								
C	20	25								
C2	.05	200	C503-2	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C3	.05	200	C503-2	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C4	.05	200	C503-2	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C5	100		CC101	S1100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C6A	220									
B	5000									
C			*PC-151	*PA-113-2	*PC-151		*1408-02		*103C5	
D	5000									
E										
C7	.01	600	CC101	P688-01	DD-1032	PTE6S1	GP2-333-103	PT611	6TM-S1	
C8	.005	200	C502-6	P688-005	D6-502	PTE6D5		PT625	6TM-D5	
C9	.008	1600	C802-16	VBC-26		PTE16D8		PT1628	MB-D8	
C10	.5	100	CC504-1	VHC-36		MP2P5		RF480	2TM-P5	
C11	.5	100	CC504-1	VHC-36		MP2P5		RF480	2TM-P5	

* C6A, C6B, C6C, C6D, C6E and R8A, R8B, R8C are combined in one unit.
When replacing items separately C6E and C6C must total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	AIRLINE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	750KΩ	½	RV-57	Q13-137	AG-79-Z	B-70-S	U-51	Volume-Note
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWB	Not Req.	US-26	Attach to R1A

Note: Some Models may use an alternate control (part #RV-333)

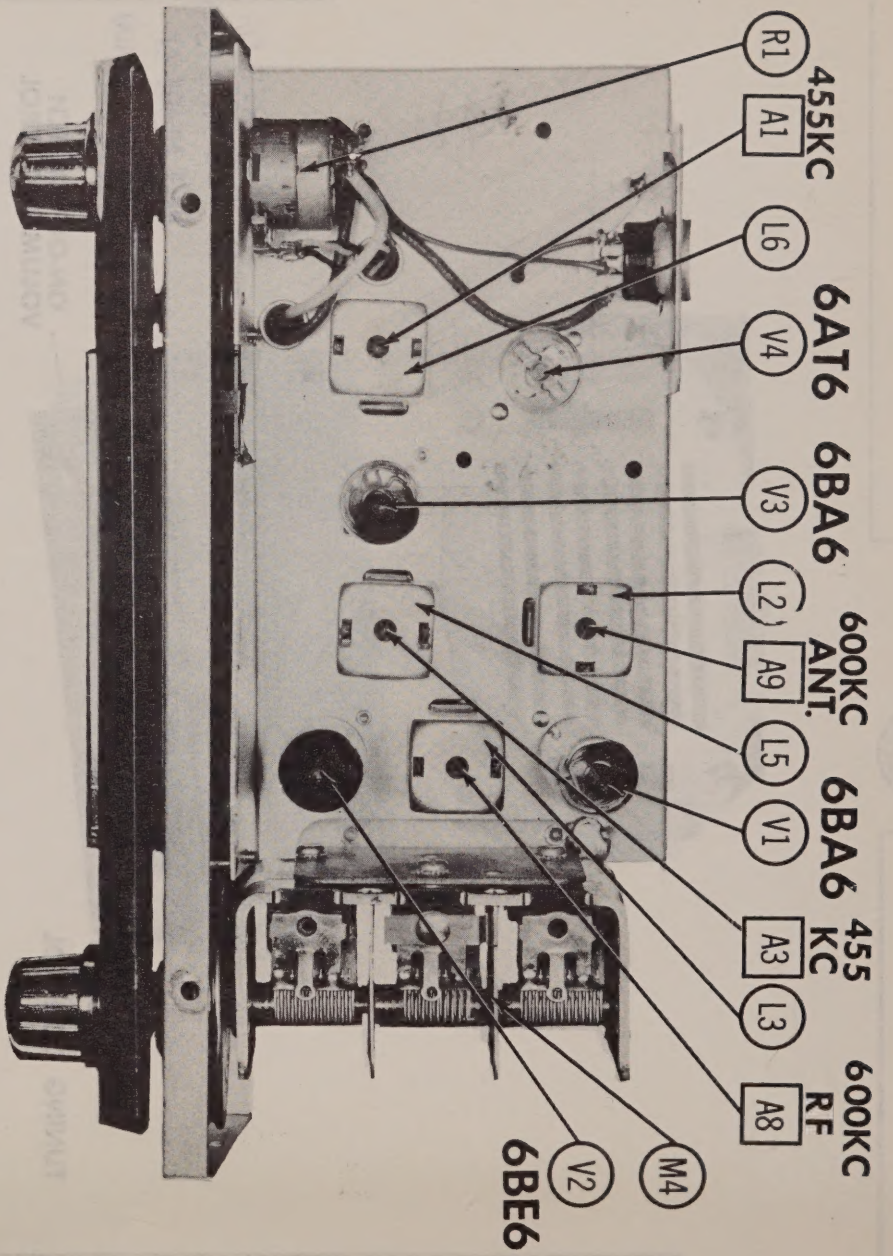
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	AIRLINE PART No.	IRC PART No.	
R2	1.2Meg	½	R125	BTS-1.2Meg	
R3	330Ω	½	R331	BTS-330	
R4	22KΩ	½	R223	BTS-22K	
R5	1500Ω	½	R152	BTS-1500	
R6	22KΩ	2	R223-2	BTB-22K	
R7	2.2Meg	½	R225	BTS-2.2Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	AIRLINE PART No.	IRC PART No.	
R8A	6.8Meg	½		BTS-6.8Meg	
B	470KΩ	½	*PC-151	BTS-470K	
C	470KΩ	½		BTS-470K	
R9	470KΩ	½	R474	BTS-470K	
R10	330Ω	½	R331	BTS-330	
R11	1000Ω	1	R102-1	BTA-1000	
R12	100Ω	½	R101	BTS-100	Note
R13	100Ω	½	R101	BTS-100	Note

* Items R8A, R8B, R8C, C6A, C6B, C6C, C6D, C6E are combined in one unit.
Note 1. Some Models may use a 82Ω resistor in this application.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	AIRLINE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	6.3VAC @2A	430VCT .046ADC			TV-100		P-2971	V-16K	V3801	T-22R26①

① Drill one new mounting hole.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA						NOTES
	IMPEDANCE		DC RES.		AIRLINE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
	PRI.	SEC.	PRI.	SEC.							
T2	5KΩ	3.2Ω	370Ω	.54Ω	Part of Spkr.	A-3877	A-2930	S-3X	Z1001	TS-24S51	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	AIRLINE PART No.	JENSEN PART No.	QUAM PART No.	
SP1	6 x 9"	PM	3.2Ω	PM-900	ST-810 Mod. P69-V	69A3	

COILS (RF-IF)

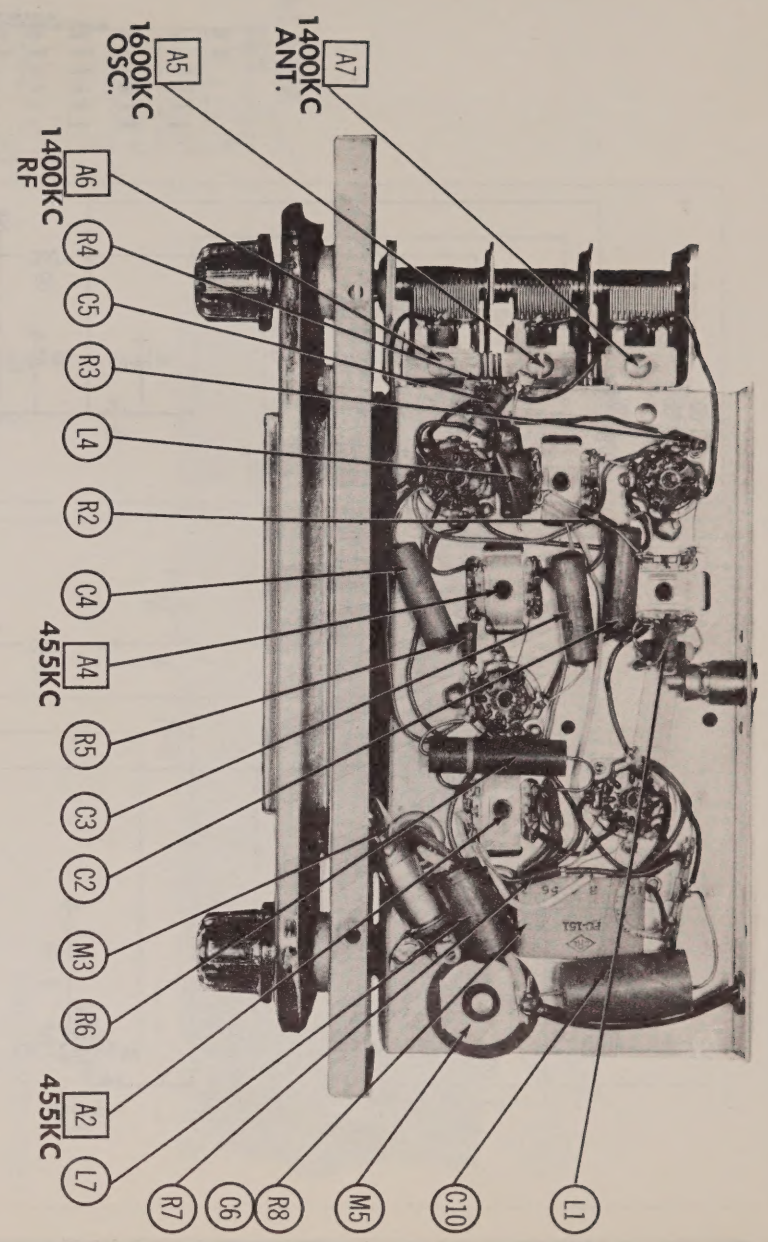
ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	AIRLINE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant.RF Choke	1.1Ω		L200			4624 *	14 Microhenries, wound on 10MMF capacitors.
L2	Ant. Coil	14Ω	4.6Ω	57FB-3				
L3	RF Coil	95Ω	6Ω	57FB-4				
L4	Osc.Coil	9Ω		L201			71-Osc.†	Tapped @ .7Ω
L5	Input IF	19Ω	19Ω	1655-16	16-6758	BC-352	12-C1	
L6	Output IF	19Ω	19Ω	1655-16	16-6758	BC-353	12-C2	
L7	Fil. Choke	0Ω		L203			5221	15 Microhenries
L8	Vibrator Hash Choke	0Ω		L202				21 Microhenries

* Connect in series with 10MMF Capacitor.
† Drill mounting hole.

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				AIRLINE PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	6.3V	115∿	V-83	5301	859	5301	

CHASSIS—BOTTOM VIEW



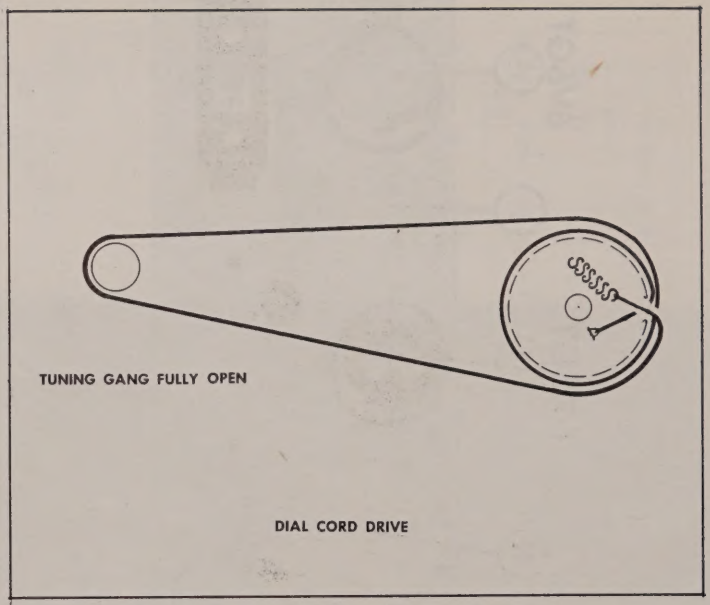
PARTS LIST AND DESCRIPTIONS (Continued)

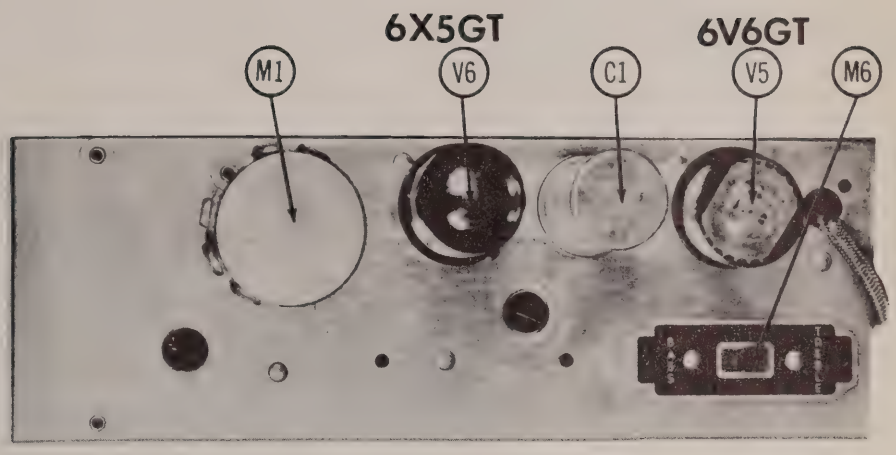
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			AIRLINE PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	SFE	14A	A200		307014 (14A-SFE)	155014	SFE14	HD1

MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M3	Dial Light	T-47	Type #47
M4	Tuning Cap.	CV-100A	(23-391MMF, 24-387MMF, 35-198MMF)
M5	Spark Plate		
M6	Switch		Bass-treble
	Knob	H310E	Volume & Tuning (2 Used)
	Dial Scale	D333	
	"A" Lead Assy.	FH226	Includes fuse holder





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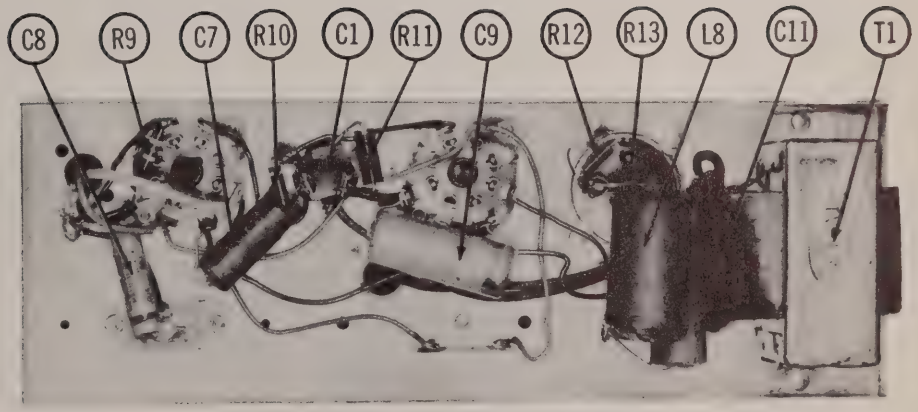

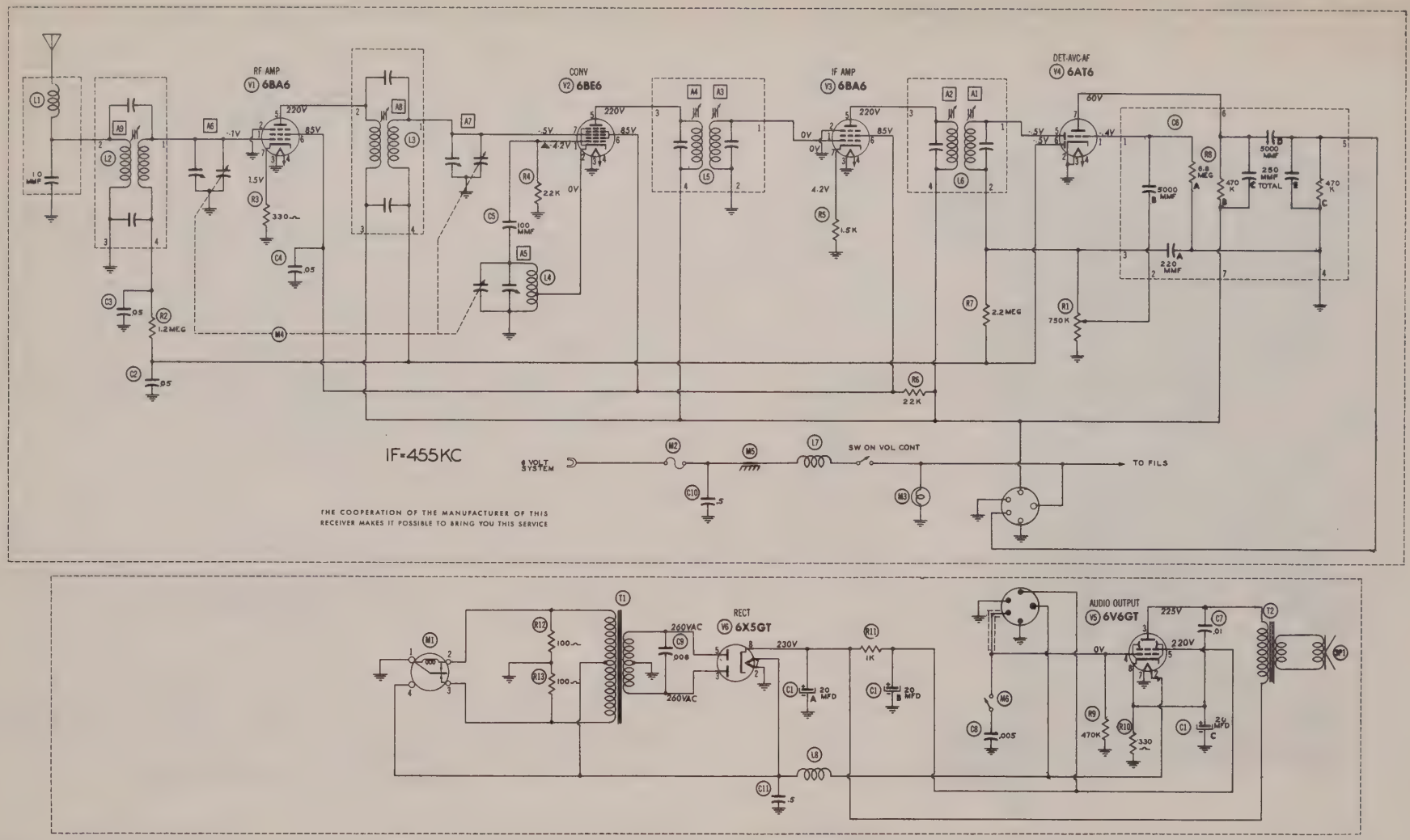

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6BA6	4.2Meg	0Ω	0Ω	.1Ω	†1KΩ	†22KΩ	330Ω	
V 2	6BE6	22KΩ	.7Ω	0Ω	.1Ω	†1KΩ	†22KΩ	2Meg	
V 3	6BA6	1MΩ	0Ω	0Ω	.1Ω	†1KΩ	†22KΩ	1.5KΩ	
V 4	6AT6	6.6Meg	0Ω	0Ω	.1Ω	750KΩ	2Meg	†470KΩ	
V 5	6V6GT	INF	.1Ω	†370Ω	†1KΩ	340KΩ	INF	0Ω	330Ω
V 6	6X5GT	INF	.1Ω	400Ω	INF	440Ω	INF	0Ω	2Meg

Δ TAKEN WITH VACUUM TUBE VOLTMETER
† MEASURED FROM PIN 8 OF V6

1 - DC Voltage measurements are at 20,000 ohms per volt, AC Voltagre measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Battery voltage maintained at 6.3 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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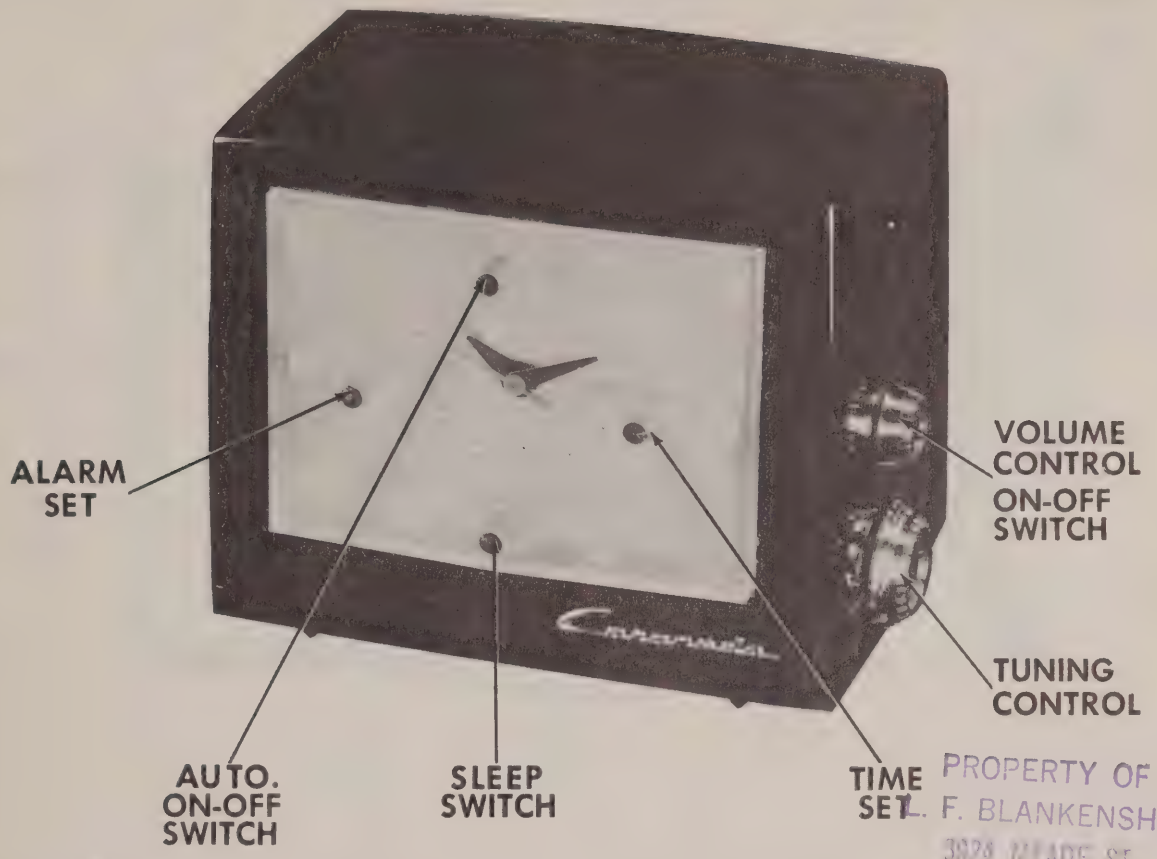
CORONADO
MODEL 35RA40-43-8247A



PROPERTY OF
L. F. BLANKENSHIP
3824 MEADE ST
DENVER, COLORADO

CORONADO
MODEL 35RA40-43-8247A

TRADE NAME	Coronado Model 35RA40-43-8247A
SUPPLIER	Gamble-Skogmo, Inc., 15 N. 8th. St., Minneapolis, Minn.
TYPE SET	AC Operated AM Superheterodyne Receiver with Electric Clock
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AT6 Det.-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycle — RATING .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1650KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1650KC	"	"	A5	"
3.		Loop	1500KC	Tune to 1500KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

CORONADO
MODEL 35RA40-43-8247A

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		CORONADO PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amp.	12BA6	12BA6	7BK	
V3	Det-AVC-AF Amp.	12AT6	12AT6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	CORONADO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	30	150	CET-19	PRS150/30-50		EDL-5315 S5		2N520	TVA-2450	Yellow Red
C2	.05	400	CP-4-15	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C3A	220		♦CRP-5	♦PA-113-1	♦PC-150	♦116TM1	♦1408-01		♦103C4	
B	2000									
C	5000									
D }	250									
E										
C4	.02	400	CP-4-12	P488-02	DF-203	CUB4S2		PT412	4TM-S2	
C5	.02	600	CP-6-12	689ZX-02		PJ6S2		PT612	6TM-S2	
C6	.1	400		P488-1		CUB4P1		PT401	4TM-P1	Note 1

♦ Items C3A, C3B, C3C, C3D, C3E, R5A, R5B and R5C are combined in one unit.
When replacing items separately items C3D and C3E should total 250MMF.
Note 1. Some models use an .05MFD in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	CORONADO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	P29	Q13-133	AG-60-Z	B-60	U-48	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A.

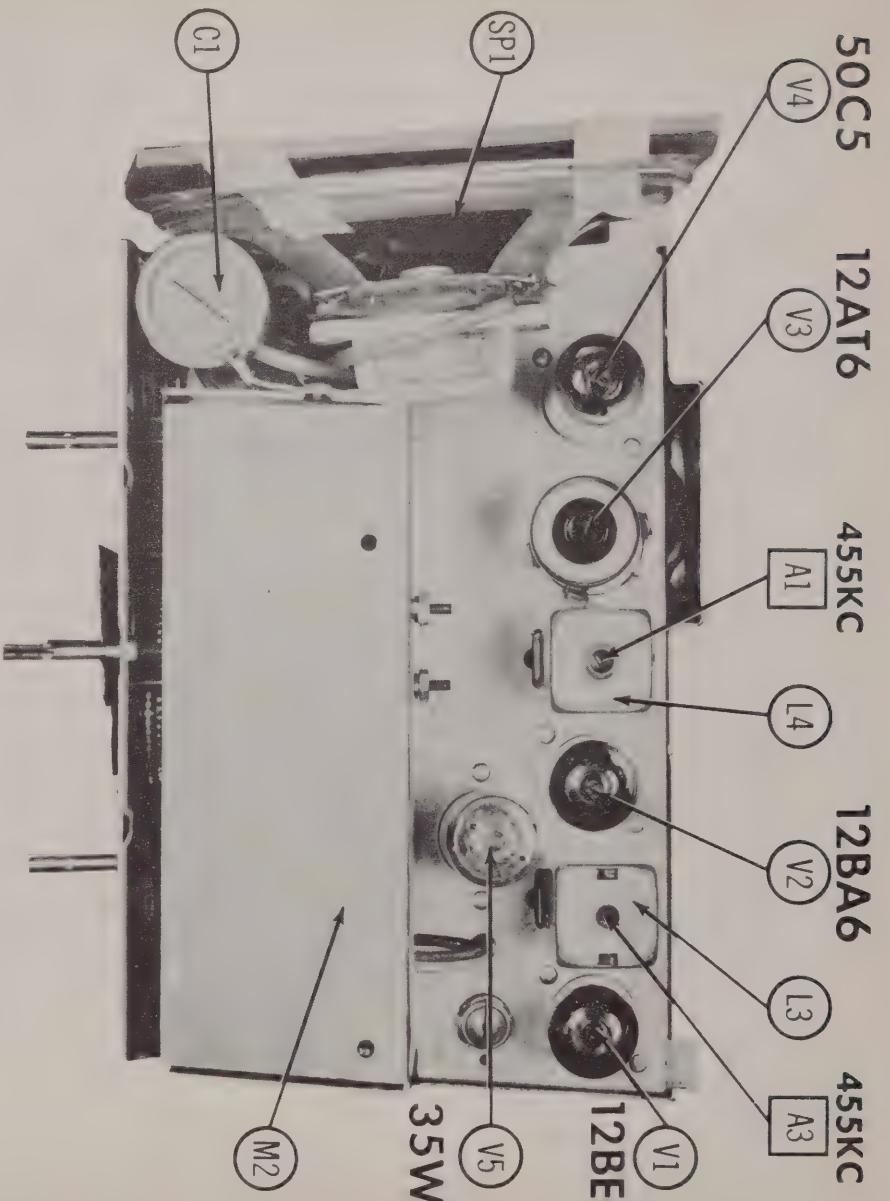
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CORONADO PART No.	IRC PART No.	
R2	22KΩ	½	RC-223-2	BTS-22K	
R3	220Ω	½	RC-221-2	BTS-220	
R4	1 Meg	½	RC-105-2	BTS-1 Meg	
R5A	6.8Meg	½	♦CRP-5	BTS-6.8Meg	
B	470KΩ	½		BTS-470K	
C	470KΩ	½		BTS-470K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CORONADO PART No.	IRC PART No.	
R6	150Ω	½	RC-151-2	BTS-150	
R7	1800Ω	1	RC-182-4	BTA-1800	
R8	18Ω	½	RC-180-2	BTS-18	

♦ Items R5A, R5B, R5C, C3A, C3B, C3C, C3D, C3E are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	CORONADO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	2.4KΩ	3.5Ω	T135	A-3332	A-3025	S-1X ①	Z1101	TS-24S50	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	CORONADO PART No.	VIKING PART No.	QUAM PART No.	
SP1	4"	PM	3.5Ω	PMS-10	4J4	4A07	

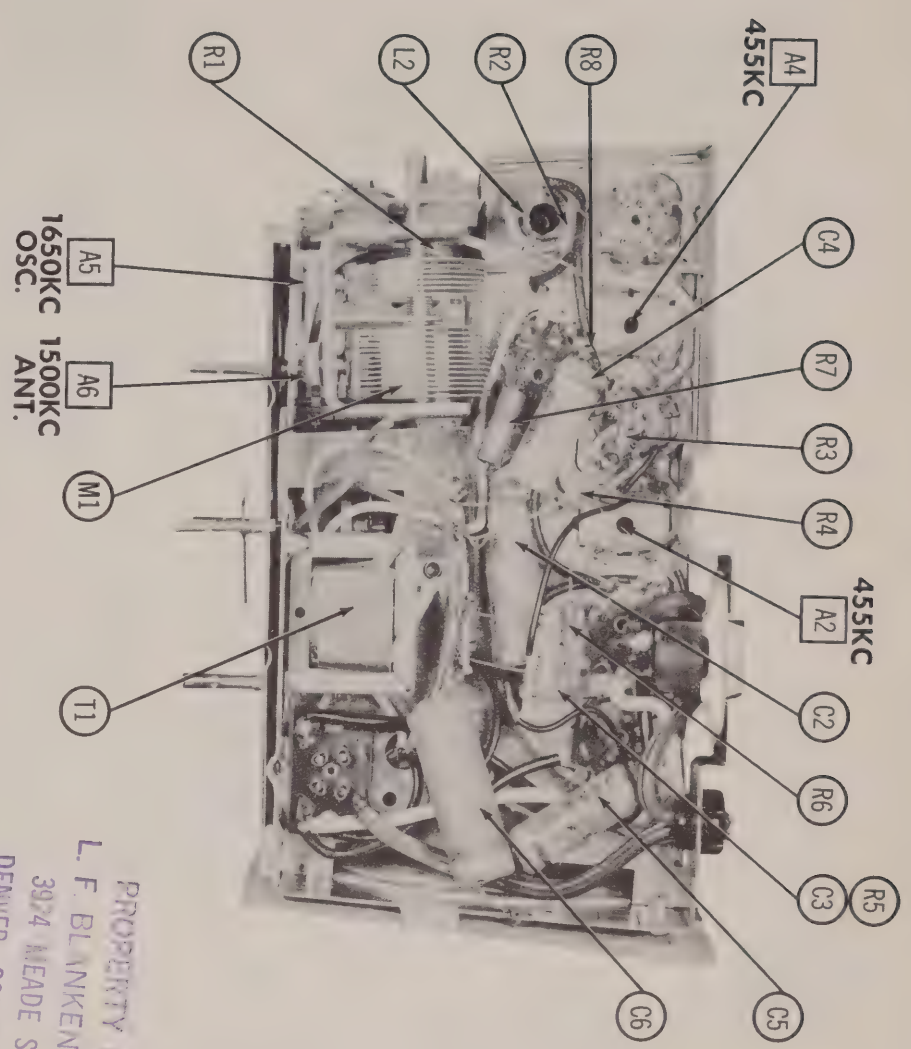
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	CORONADO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	2.7Ω		LA-9				
L2	Osc. Coil	.6Ω	6.5Ω	LO-9	14-1073		69-Osc.	
L3	Input IF	17Ω	17Ω	LIF-13	16-6758	BC-352	12-C1	
L4	Output IF	14Ω	14Ω	LIF-13	16-6758	BC-353	12-C2	

MISCELLANEOUS

ITEM No.	PART NAME	CORONADO PART No.	NOTES
M1	Tuning Cap	CV8	2 section (37-400MMF, 14-165MMF)
M2	Clock		
	Knob	KM52	Tuning
	Knob	KM53	Volume

CHASSIS—BOTTOM VIEW



PROPERTY OF
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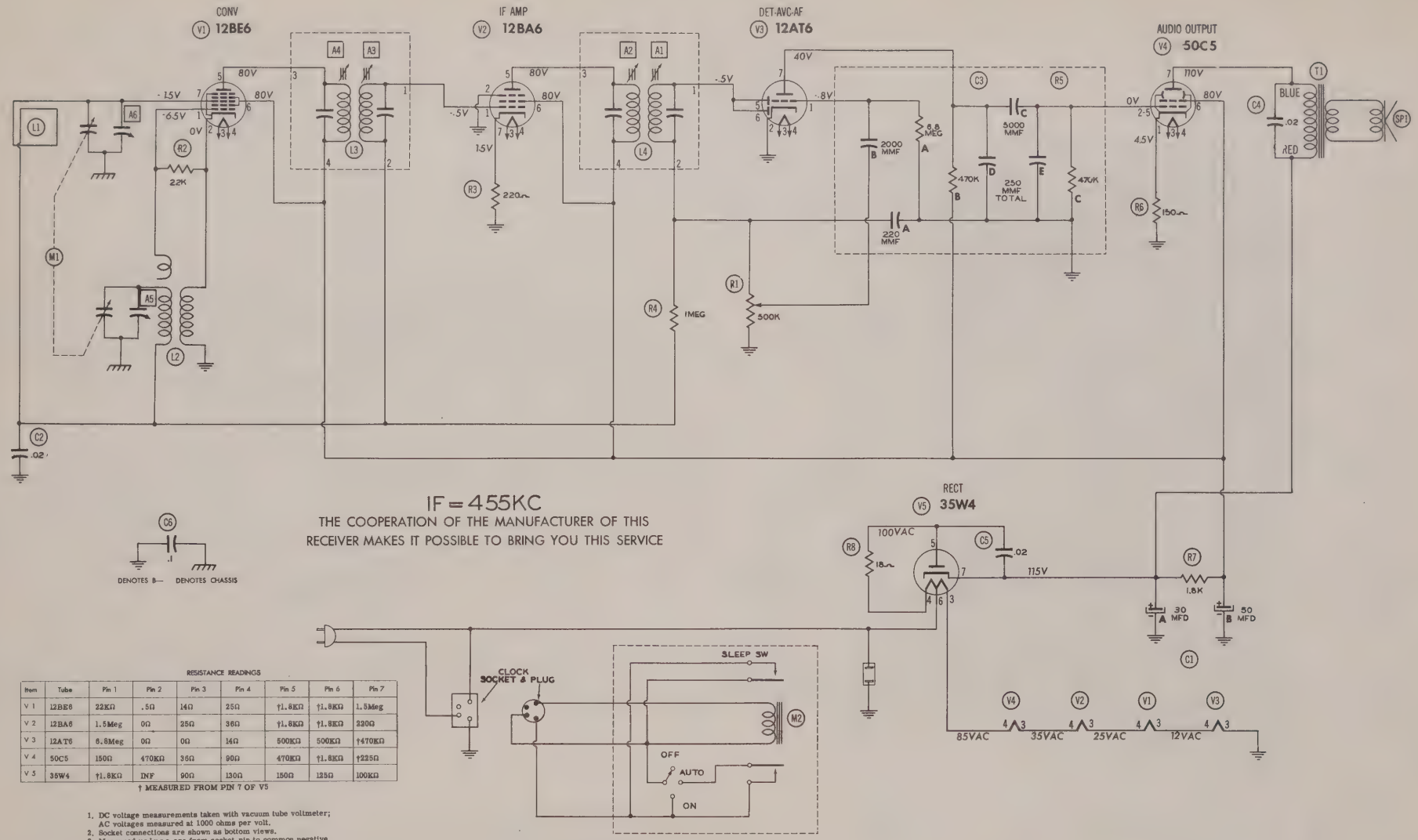
3924 MEADE ST.
DENVER, COLORADO



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.5Ω	14Ω	25Ω	†1.8KΩ	†1.8KΩ	1.5Meg
V 2	12BA6	1.5Meg	0Ω	25Ω	36Ω	†1.8KΩ	†1.8KΩ	230Ω
V 3	12AT6	6.8Meg	0Ω	0Ω	14Ω	500KΩ	500KΩ	†470KΩ
V 4	50C5	150Ω	470KΩ	36Ω	90Ω	470KΩ	†1.8KΩ	†225Ω
V 5	35W4	†1.8KΩ	INF	90Ω	130Ω	150Ω	125Ω	100KΩ

† MEASURED FROM PIN 7 OF V5

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ESPEY
MODEL 100

TONE CONTROL ON-OFF SWITCH

RECORD COMPENSATION SWITCH

TUNING CONTROL

VOLUME CONTROL

FUNCTION SELECTOR SWITCH

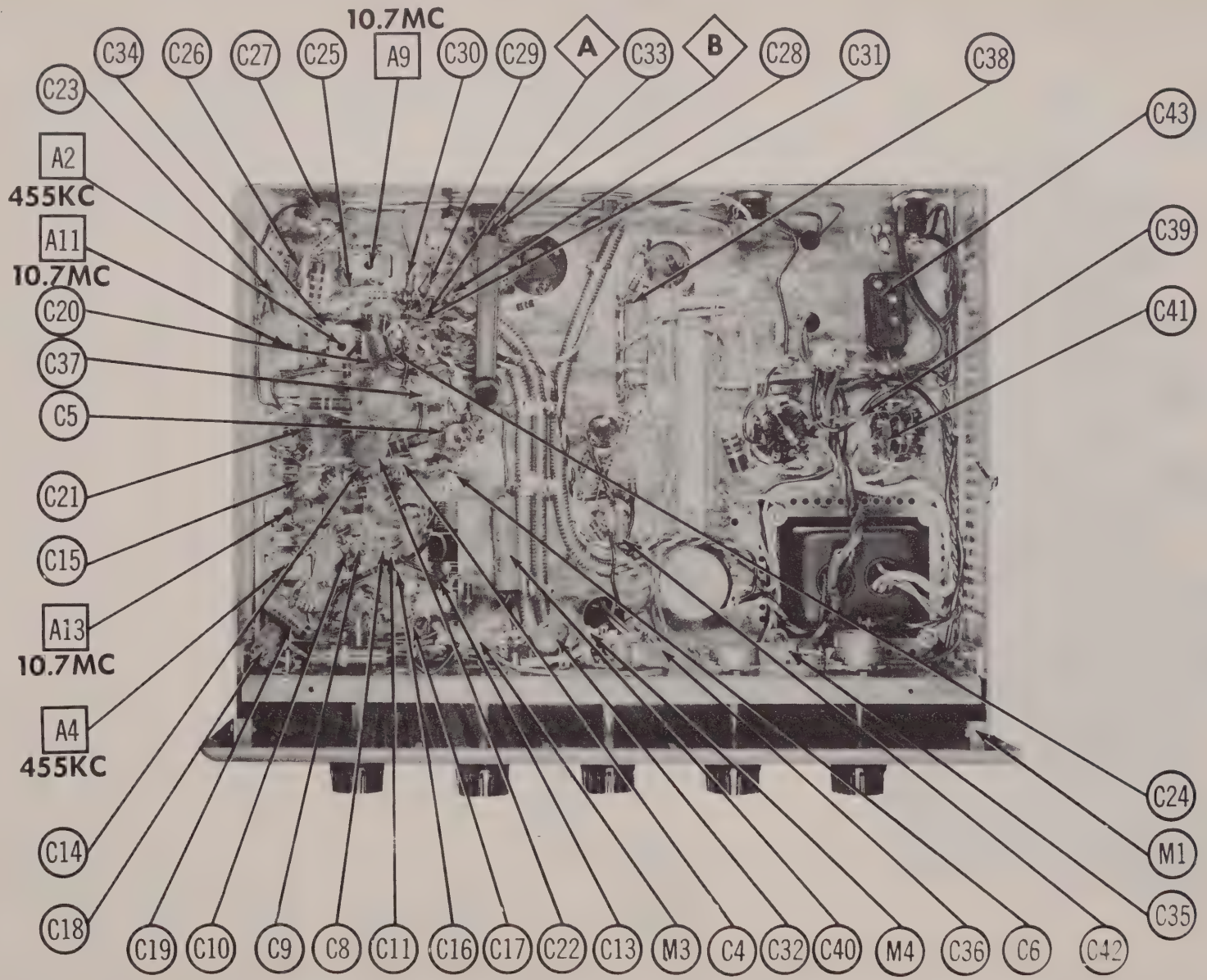
PROPERTY OF
L. F. BLANKENSHIP
[illegible] MEADE ST.
DENVER, COLORADO

ESPEY
MODEL 100

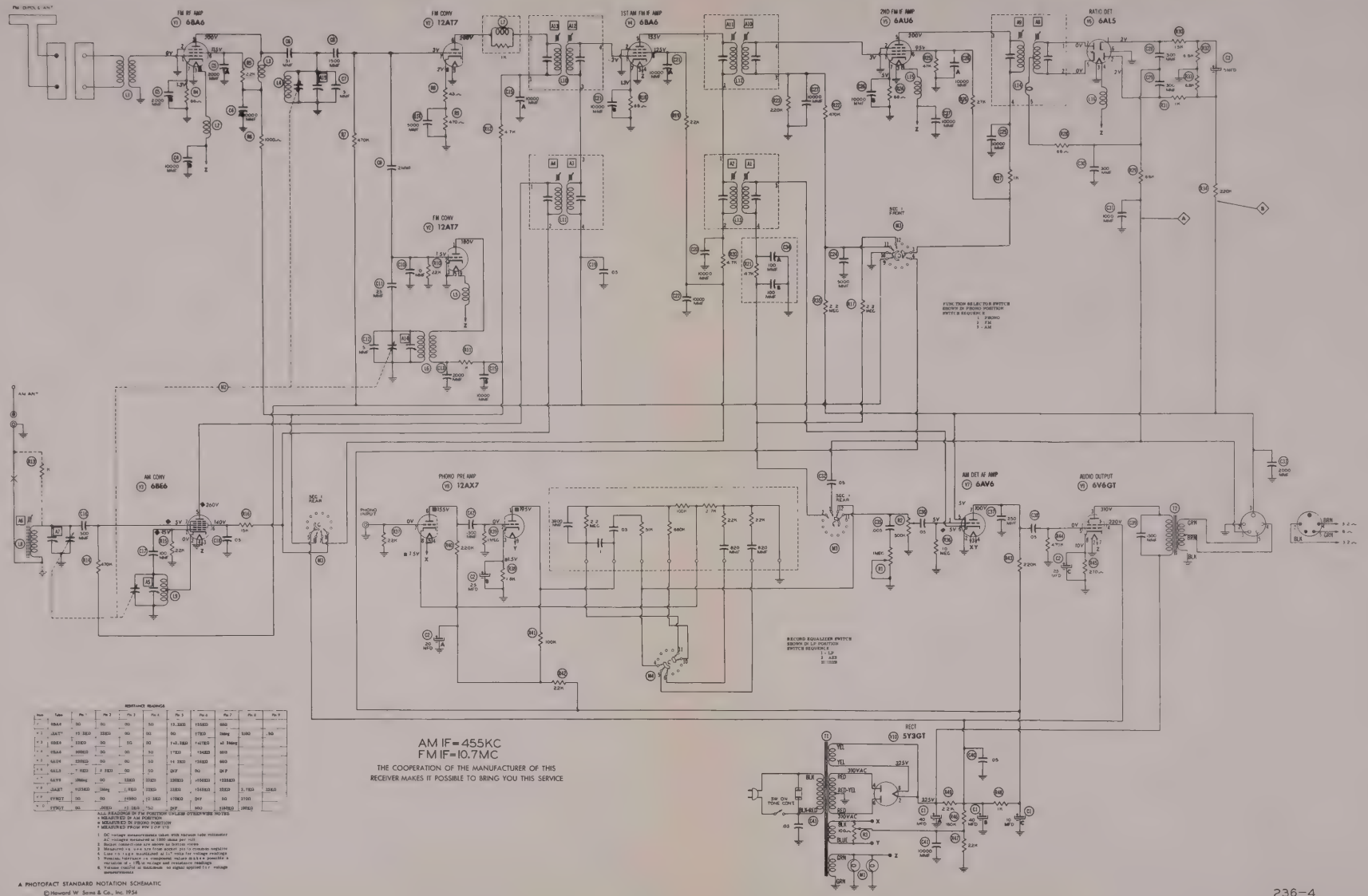
TRADE NAME	Espey Model 100	
MANUFACTURER	Espey Mfg. Co., Inc., 528 E. 72nd. St, New York 21, N.Y.	
TYPE SET	AC Operated AM-FM Superheterodyne Tuner with Phono Provisions for Custom Installation	
TUBES (Ten)	Types 6BA6 FM RF Amp., 12AT7 FM Conv., 6BE6 AM Conv., 6BA6 FM-AM IF Amp., 6AU6 FM IF Amp., 6AL5 Ratio Det., 6AV6 AM Det.-AF Amp., 12AX7 Phono Pre-Amp., 6V6GT Audio Output, 5Y3GT Rectifier	
POWER SUPPLY	110-120 Volts AC	RATING .62 Amp. @ 117 Volts AC
TUNING RANGE - BROADCAST	535-1720KC	FREQ. MOD. 88-108MC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1954 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION


FM RF AMP
V1 6BA6
FM CONV
V2 12AT7
1ST AM FM IF AMP
V4 6BA6
2ND FM IF AMP
V5 6AU6
RATIO DET
V6 6AL5
FM CONV
V3 12AT7
AM CONV
V7 6BE6
PHONO PRE AMP
V8 12AX7
AM DET AF AMP
V7 6AV6
AUDIO OUTPUT
V9 6V6GT
RECT
V10 5Y3GT
FUNCTION SELECTOR SWITCH
SHOWN IN PHONO POSITION
SWITCH SEQUENCE: R
1 - PHONO
2 - FM
3 - AM
RECORD EQUALIZER SWITCH
SHOWN IN LP POSITION
SWITCH SEQUENCE: R
1 - AES
2 - RIAA
AM IF=455KC
FM IF=10.7MC
THE COOPERATION OF THE MANUFACTURER OF THIS
RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
RESISTANCE READINGS
ALL READINGS IN FM POSITION UNLESS OTHERWISE NOTED.
+ MEASURED IN AM POSITION
* MEASURED IN PHONO POSITION
† MEASURED FROM RFM 1 TO F10
1. DC voltage measurements taken with Hycon tube voltmeter
A.C. voltages measured at 1000 cycles per volt.
2. Socket connections are above as bottom views.
3. Measured as ohms from socket pin to chassis ground.
4. Line voltage fluctuations may cause voltage readings
5. Low line voltage conditions may cause values shown possible a variation of ± 15% in voltage and resistance readings.
6. Values marked as maximum, no signal applied to any voltage measurements.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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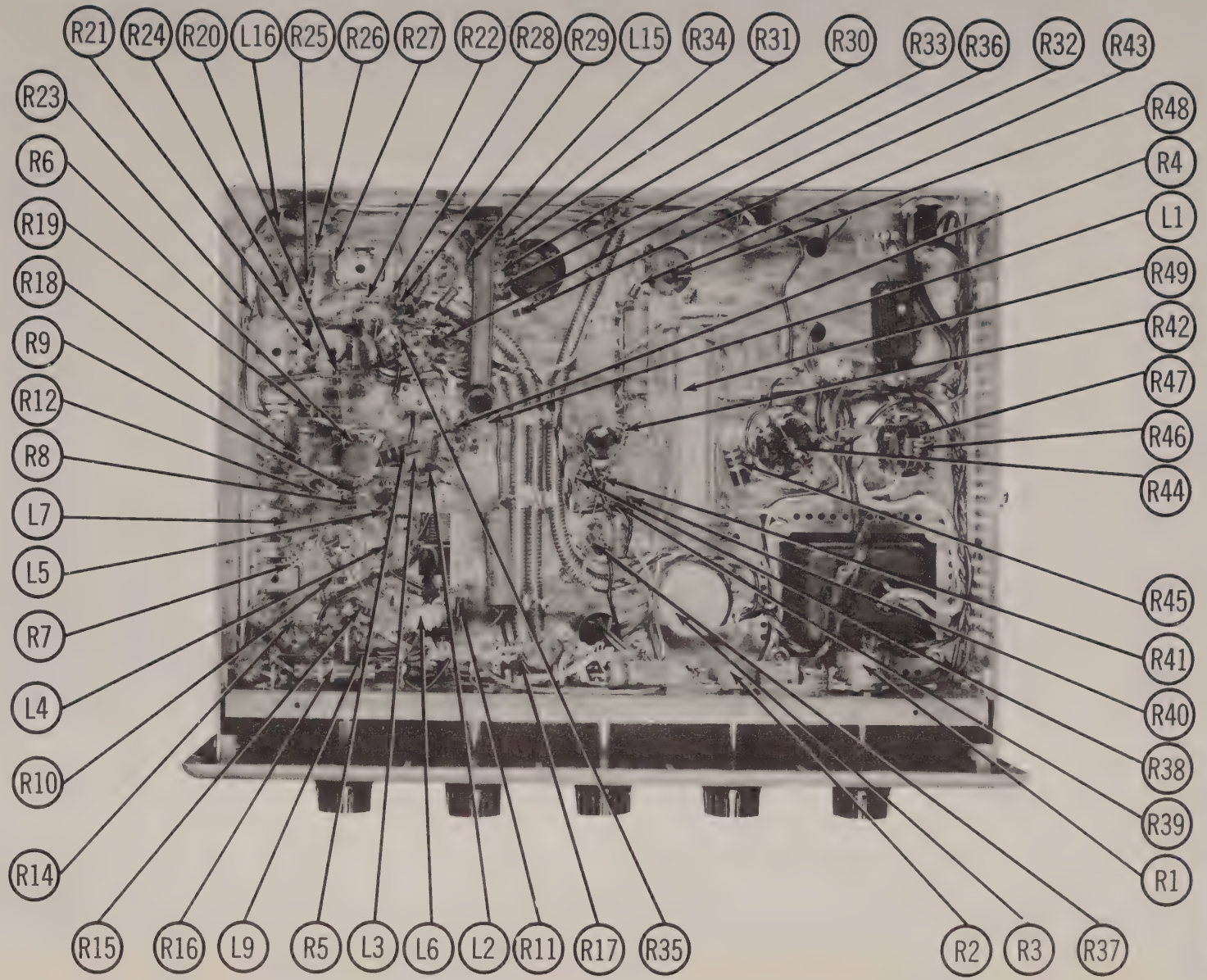
236-4



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. DUMAS CHIP
3924 MIRAE ST.
DENVER, COLORADO

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Turn tone control fully clockwise.
With tuning gang fully closed, set dial pointer to index mark just to the left of "55" on the dial.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	455KC (400~Mod)	AM	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum deflection.
2.	"	High side to pin 7 (grid) of 6BE6 (V3). Low side to chassis.	"	"	"	"	A3, A4	"
3.	5MMF	High side thru 5MMF to AM antenna socket. Low side to chassis.	1700KC	"	1700K	"	A5	"
4.	"	"	600KC	"	600KC	"	A6	"
5.	"	"	1550KC	"	1550KC (small index mark just to right of 1500 on dial)	"	A7	Adjust for maximum deflection. Repeat steps 4 and 5.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	.01MFD	High side to pin 1 (grid) of 6AU6 (V5). Low side to chassis.	10.7MC (Unmod)	FM	Point of non-interference	DC probe to point (A). Common to chassis.	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
7.	"	"	"	"	"	DC probe to point (B). Common to chassis.	A9	Adjust for maximum deflection. Repeat steps 6 and 7.
8.	"	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	"	"	"	"	A10, A11	Adjust for maximum deflection. Attenuate signal generator to maintain 1.5 volts at VTVM.
9.	"	High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis.	"	"	"	"	A12, A13	"

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
6.	.01MFD	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	10.7MC (450KC Swp)	FM	Point of non-interference	Vert. Amp. to point (B). Low side to chassis.	A9, A10, A11	Disconnect stabilizing capacitor C3. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
7.	"	High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis.	"	"	"	"	A12, A13	"
8.	"	"	"	"	"	Vert. Amp. to point (A). Low side to chassis.	A8	Reconnect stabilizing capacitor C3. Adjust so that 10.7MC occurs at center of crossover lines as in Fig. 2. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines. Continue alignment with step 10.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
10.	Two 150Ω Carbon Resistors	Across FM antenna socket terminals with 150Ω in each lead.	108MC	FM	108MC	DC probe to point (B). Common to chassis.	A14	Adjust for maximum deflection. Attenuate signal generator to maintain 1.5 volts at VTVM.
11.	"	"	106MC	"	106MC	"	A15	"
12.	"	"	90MC	"	90MC	"		Check L4 with a tuning wand. If necessary, compress or expand coil for maximum deflection.

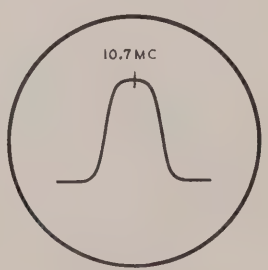


FIG. 1

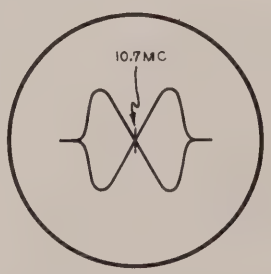


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: ESPEY PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1,	FM RF Amplifier	6BA6	6BA6	7BK	
V2	FM Converter	12AT7	12AT7	9A	
V3	AM Converter	6BE6	6BE6	7CH	
V4	1st AM FM IF Amp.	6BA6	6BA6	7BK	
V5	2nd FM IF Amp.	6AU6	6AU6	7BK	
V6	Ratio Detector	6AL5	6AL5	6BT	
V7	AM Det. AF Amp.	6AV6	6AV6	7BT	
V8	Phono Pre. Amp.	12AX7	12AX7	9A	
V9	Output	6V6GT	6V6GT	7S	
V10	Rectifier	5Y3GT	5Y3GT	5T	

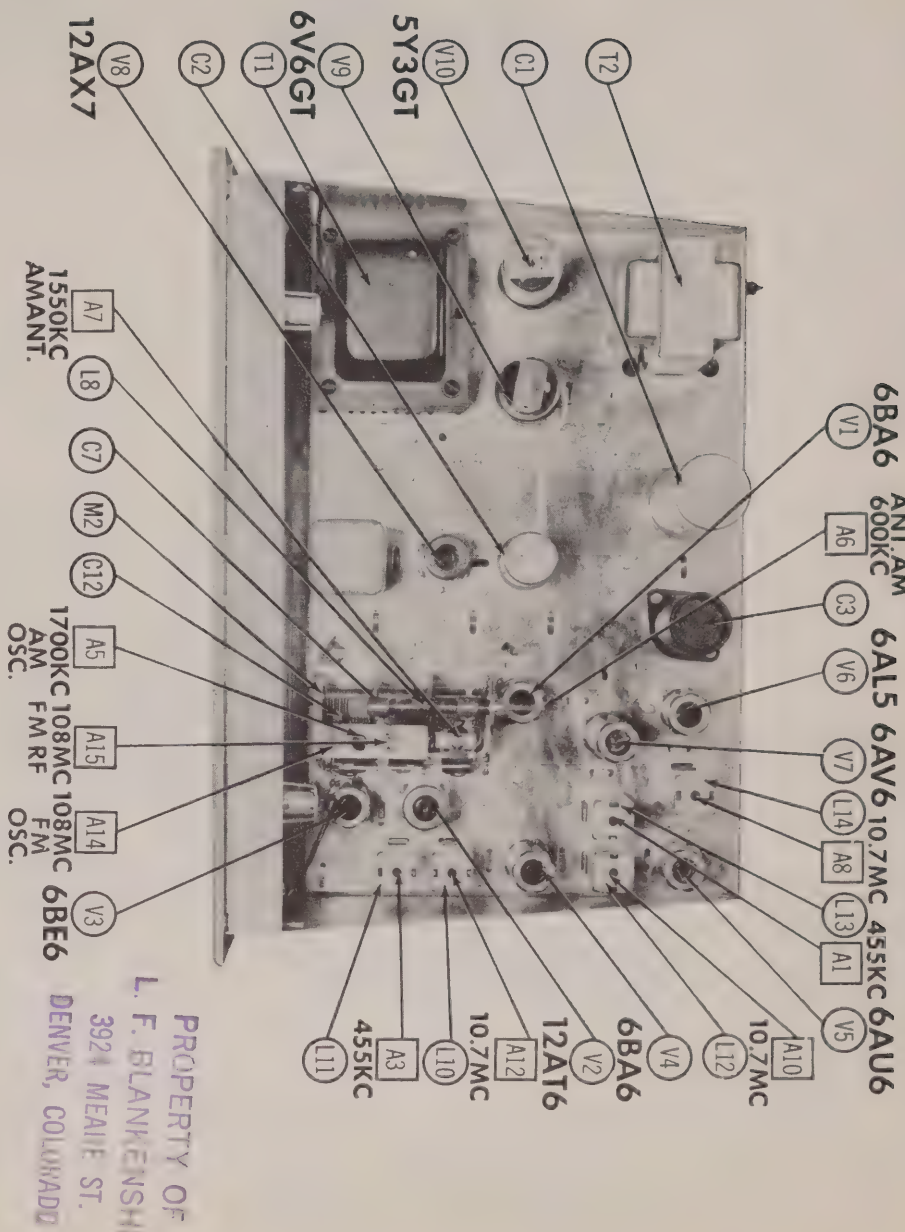
CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	ESPEY PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	450		AFH3-43		C034		FP376.8	TVL-3785	
B	■40	450								
C	▲10	450								
C2A	■20	450				B040		FP211	R1481	
B	▲25	50				BR255		TC75		
C	25	50								
C3	5	250		PRS250/4		BR425		TC50X	TVA-1501	
C4A	10000			BPD-2X01	DD3-103	DK082	811-01	DC-511	5HK-2S1	
B	10000						811-01	DC-511		
C5A	2000			BPD-2X002	DD2-202	DK072	812-002	DCD-522	5HK-2D2	
B	2000									
C6	51									
C7	5			SI5NP0	TCZ-4.7	TZ07	NP0K-050	ZT-555	5TCCB-V47	
C8	1500			SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C9	2									
C10	10			SI10N750	TCN-10	TN01	N750K-100	NT-541	5TCU-Q1	
C11	25			SI25NP0	TCZ-25	TZ15	NP0K-250	ZT-5425	5TCC-Q25	
C12	5			SI5NP0	TCZ-4.7	TZ07	NP0K-050	ZT-555	5TCCB-V47	
C13	2000			SI2000	D6-202	TP56	GP2L-202	UC-522	5HK-D2	
C14	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C15A	10000			BPD-2X01	DD3-103	DK082	811-01	DC-511	5HK-2S1	
B	10000						811-01	DC-511		
C16	500			SI500	D6-501	TP47	GP2K-501	UC-535	5GA-T5	
C17	100			SI100NP0	TCZ-100	TZ30	NP0-333-101	ZT-531	5TCC-T1	
C18	.05	400		P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C19	.05	200		P288-05	DF-503	CUB2S5		PT415	2TM-S5	
C20	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C21A	10000			BPD-2X01	DD3-103	DK082	811-01	DC-511	5HK- 2S1	
B	10000						811-01	DC-511		
C22	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C23	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C24	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C25	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C26A	10000			BPD-2X01	DD3-103	DK082	811-01	DC-511	5HK-2S1	
B	10000						811-01	DC-511		
C27	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C28	300			SI300	D6-301	TP42	GP2K-301	UC-533	5GA-T3	
C29	300			SI300	D6-301	TP42	GP2K-301	UC-533	5GA-T3	
C30	300			SI300	D6-301	TP42	GP2K-301	UC-533	5GA-T3	
C31	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C32	.05	200		P288-05	DF-503	CUB2S5		PT415	2TM-S5	
C33	2000			SI2000	D6-202	TP56	GP2-333-202	UC-522	5HK-D2	
C34A	100			♦PA-97-1	♦PC-50	♦111TM1	♦1403-01	UC-531	♦100C1	
B	100							UC-531		
C35	.005	600		P688-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C36	.05	200		P288-05	DF-503	CUB2S5		PT415	2TM-S5	
C37	250	500		1468-00025	D6-251	5W5T25	GP2K-251	MC240	1FM-325	
C38	.05	400		P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C39	1500	1500		HVD15-0015			1R5KV-152	MCK215		
C40	.05	400		P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C41	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C42	1500			SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C43	.05	400		489ZX-05		CUB4S5		PT415	4TM-S5	

♦ Items C34A, C34B, R21 are combined in one unit.

CHASSIS—TOP VIEW



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ESPEY PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1 Meg	½	A9.317-A	Q13-137	AG-63-Z	B-70-S	U-53	Tone
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWB	Not Req.	US-26	Attach to R1A
R2A	500KΩ	½	A9.309A	Q13-133	AG-60-Z	B-60	U-48	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	100Ω	2	A9.310-A	W-100	A43-100	VK-121	C100P	Hum Balance
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R3A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ESPEY PART No.	IRC PART No.	
R4	68Ω	½		BTS-68	
R5	22KΩ	1		BTA-22K	
R6	1000Ω	½		BTS-1000	
R7	470KΩ	½		BTS-470K	
R8	43Ω	½		BTS -43	
R9	470Ω	½		BTS-470	
R10	22KΩ	½		BTS-22K	
R11	1000Ω	½		BTS-1000	
R12	4700Ω	½		BTS-4700	
R13	1000Ω	½		BTS-1000	Note 1
R14	470KΩ	½		BTS-470K	
R15	22KΩ	½		BTS-22K	
R16	15KΩ	2		BTB-15K	
R17	2.2Meg	½		BTS-2.2Meg	
R18	68Ω	½		BTS-68	
R19	22KΩ	1		BTA-22K	
R20	4700Ω	½		BTS-4700	
R21	47KΩ	½	♦	BTS-47K	
R22	470KΩ	½		BTS-470K	
R23	220KΩ	½		BTS-220K	
R24	68Ω	½		BTS-68	
R25	47KΩ	1		BTA-47K	
R26	27KΩ	½		BTS-27K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ESPEY PART No.	IRC PART No.	
R27	1000Ω	½		BTS-1000	
R28	68Ω	½		BTS-68	
R29	68KΩ	½		BTS-68K	
R30	1500Ω	½		BTS-1500	
R31	1000Ω	½		BTS-1000	
R32	6800Ω	½		BTS-6800	
R33	6800Ω	½		BTS-6800	
R34	220KΩ	½		BTS-220K	
R35	2.2Meg	½		BTS-2.2Meg	
R36	10 Meg	½		BTS-10 Meg	
R37	22KΩ	½		BTS-22K	
R38	1800Ω	½		BTS-1800	
R39	1 Meg	½		BTS-1 Meg	
R40	220KΩ	½		BTS-220K	
R41	100KΩ	½		BTS-100K	
R42	22KΩ	½		BTS-22K	
R43	220KΩ	½		BTS-220K	
R44	470KΩ	½		BTS-470K	
R45	270Ω	2			
R46	180KΩ	½		BTS-180K	Note 2
R47	22KΩ	½		BTS-22K	
R48	1000Ω	½		BTS-1000	
R49	2200Ω	15	14.294		

Note 1. Not used in all models.
Note 2. Some models may use a 150KΩ resistor in this application.
♦ Items R21, C34A, C34B are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	ESPEY PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @.52A	616VCT .076A	5VAC @2A	B18.125B						F-25R15
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC @.59A	6.3VAC @2.29A								

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ESPEY PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	5.1KΩ	8Ω tap @ 4Ω	15.146			S-29X①	Z1109 ①		① Use 4Ω and 8Ω Sec. taps, tape extra taps.

CHASSIS—BOTTOM VIEW

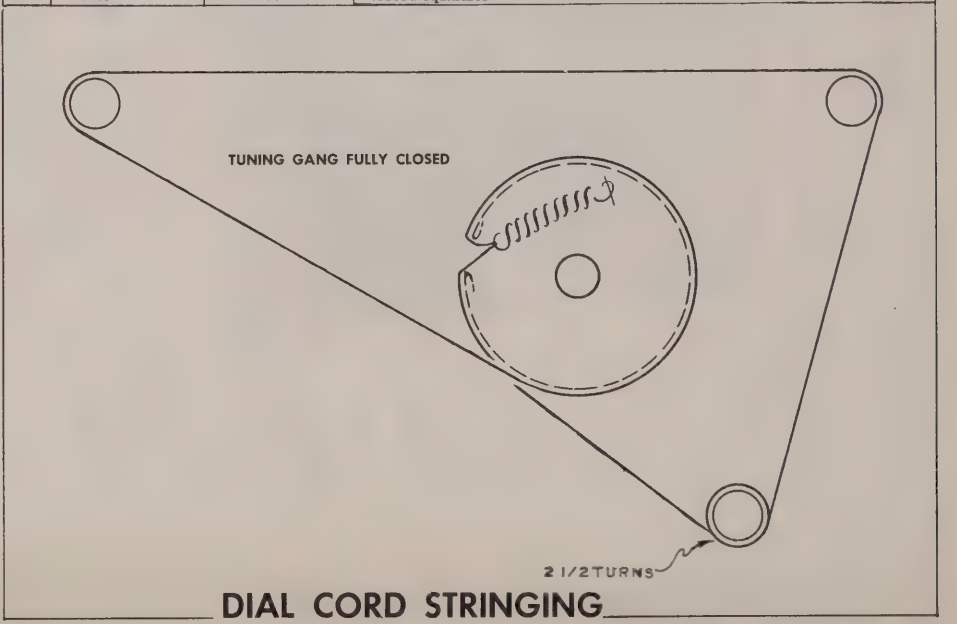
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	ESPEY PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	FM Ant. Coil	0Ω	0Ω	A2.241				
L2	Fil. Choke	.3Ω		2.702	19-1001	TV-189	4604	1.5 Microhenries; IRC Part # CLA
L3	FM RF Choke	1Ω		A2.402	19-1002		4606	3 Microhenries
L4	FM RF Choke	0Ω		A2.243				
L5	Fil. Choke	.3Ω		2.702	19-1001	TV-189	4604	1.5 Microhenries; IRC # CLA
L6	FM Osc. Coil	0Ω	0Ω	B2.735				
L7	Parasitic Suppressor	0Ω		A.402	19-1002 †		4606 †	3 Microhenries; wound on 1KΩ resistor
L8	AM Ant. Coil	1.2Ω		2.699			6300	
L9	AM Osc. Coil	6.5Ω		A2.698			71-Osc. *	Tapped @ .8Ω
L10	1st FM IF	.6Ω	.6Ω	2.415	16-3487	FM-254	1463	
L11	1st AM IF	9.5Ω	9.5Ω	2.275	16-6758	BC-352	12-C1	
L12	2nd FM IF	.6Ω	.6Ω	2.415	16-3487	FM-254	1463	
L13	2nd AM IF	9.5Ω	9.5Ω	2.275	16-6758	BC-353	12-C2	
L14	Ratio Det.	1.4Ω	.9ΩCT	2.474	17-3488 ♦	FM-255	1465	Tertiary winding=.4Ω
L15	Fil. Choke	.3Ω		2.702	19-1001	TV-189	4604	1.5 Microhenries; IRC Part # CLA
L16	Fil. Choke	.3Ω		2.702	19-1001	TV-189	4604	1.5 Microhenries; IRC Part # CLA

† Parallel with 1KΩ resistor.
* Drill mounting hole.
♦ Cut out chassis hole and drill mounting holes.

MISCELLANEOUS

ITEM No.	PART NAME	ESPEY PART No.	NOTES
M1	Dial light		# 47 bayonet (2 used)
M2	Tuning cap	16.116	AM sections (37-482MMF, 22-150MMF)
M3	Switch	B12.298	Function
M4	Switch	B12.295	Record equalizer



DIAL CORD STRINGING

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FORD MODEL
M-4B (FDA-18805-B1)

FORD MODEL
M-4B (FDA-18805-B1)

TRADE NAME	Ford Model M-4B (FDA-18805-B1) For 1954 Ford Cars
MANUFACTURER	Bendix Radio, Div. of Bendix Aviation Corp., Baltimore, Md.
TYPE SET	Battery Operated Custom Built Automobile Superheterodyne Receiver
TUBES (Six)	Types 6BA6 RF Amp., 6BE6 Conv., 6BA6 IF Amp., 6AV6 Det.-AVC-AF Amp., 6V6GT Audio Output, 6X5GT Rectifier
POWER SUPPLY	6 Volt Storage Battery — RATING 5.8 Amp. @ 6.3 Volts DC
TUNING RANGE - BROADCAST	540-1606 KC

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: BENDIX PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BA6	6BA6	7BK	
V2	Converter	6BE6	6BE6	7CH	
V3	IF Amplifier	6BA6	6BA6	7BK	
V4	Det-AVC-AF Amp.	6AV6	6AV6	7BT	
V5	Output	6V6GT	6V6GT	7S	
V6	Rectifier	6X5GT	6X5GT	6S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	BENDIX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	■20	350		AFH3-106		C078		FP345.8	TVL-3634	
B	▲10	300								
C	20	25								
C2	120	500	C220099-19	1469-0001			5W5T12	MCB-235	1FM-31	
C3	100		C220099-3	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C4	.1	200	C220098-8	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C5	5		CH267007-047	SI5	D6-050	TP06	GP1K-050	NT-555	5GA-V5	
C6	.1	400	C220098-6	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C7	100		C220099-16	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C8	33		C60454B-330	SI33	D6-330	TP27	GP1K-330	UC-5333	5GA-T33	
C9	22			SI22	D6-220	TP22	GP1K-220	UC-522	5GA-T22	
C10	.02	200	C220098-4	P288-02		PJ2S2		PT412	2TM-S2	
C11	.015	400	C220098-19	P488-015		CUB4S15		PT4115	4TM-S15	
C12	.004	400	C220098-18	P488-004	D6-402	CUB4D4	GP2-333-402	PT424	4TM-D4	
C13	.015	200	C220098-20	P288-015		PJ2S15		PT4115	2TM-S15	
C14	.002	600	C220098-11	P688-002	D6-202	CUB6D2	GP2L-202	PT622	6TM-D2	
C15	.5	100	C220098-16	VHC-36		MP2P5		RF-480	HC-3	
C16	.004	1600	C220098-17	P1688-004		CUB16D4		PT1624	MB-D4	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	BENDIX PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1 Meg	½	L219586-7F				UF16L	Tone (Panel)
B	500KΩ	½	Not Req.				UR55-T154	Volume- (Rear) tapped at 150K
C	Shaft		Not Req.				EB-214	Attach to R1A
D	Switch		Not Req.				US-27	Attach to R1B
R2	16-125Ω	1	C219555-6					Sensitivity (Wire wound)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	BENDIX PART No.	IRC PART No.	NOTES
R3	470KΩ	½	C220055IA-474M	BTS-470K	
R4	10KΩ	1	C220055IC-103K	BTA-10K	
R5	100Ω	½	C220055IA-101M	BTS-100	
R6	47KΩ	½		BTS-47K	
R7	220Ω	½	C220055IA-221M	BTS-220	
R8	15KΩ	2	C220055ID-153M	BTB-15K	
R9	2.2Meg	½	C22051A-225M	BTS-2.2Meg	
R10	100KΩ	½	C220055IA-104M	BTS-100K	
R11	470KΩ	½	C220055IA-474M	BTS-470K	

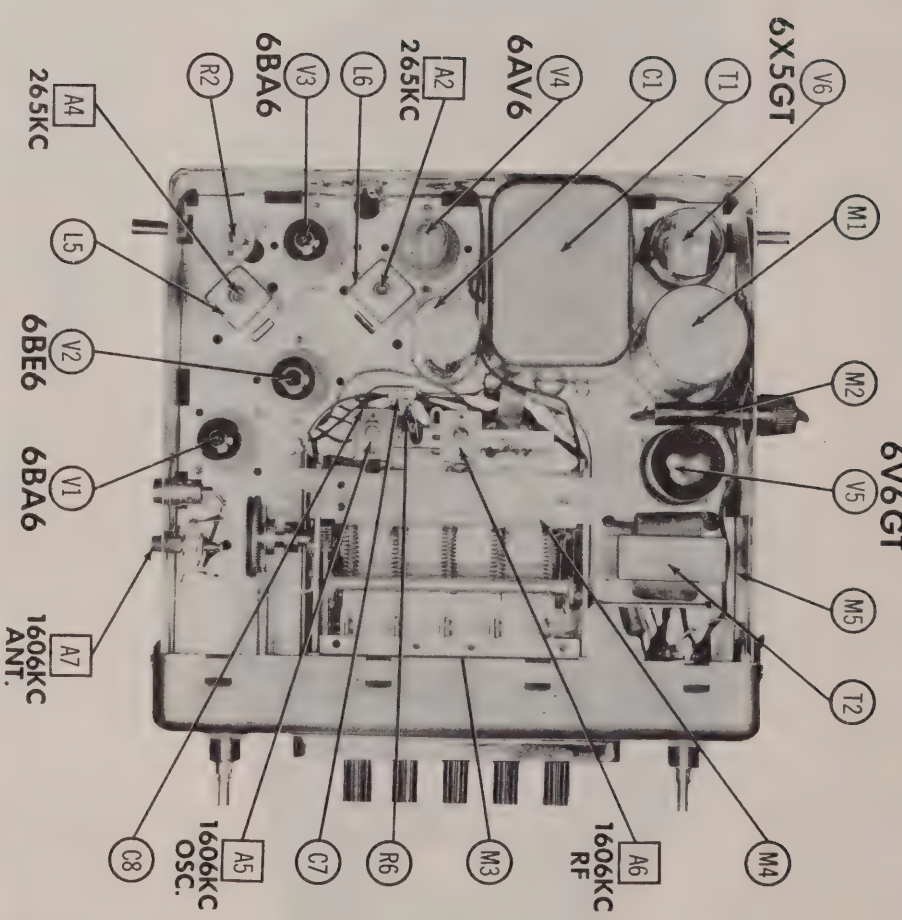
ITEM No.	RATING OHMS	RATING WATT	BENDIX PART No.	IRC PART No.	NOTES
R12	10Meg	½	C220055IA-106M	BTS-10Meg	
R13	470KΩ	½	C220055IA-474M	BTS-470K	
R14	18KΩ	½	C220055IA-183K	BTS-18K	
R15	100KΩ	½	C220055IA-104M	BTS-100K	
R16	180Ω	½	C220055IB-181K	BTS-180	
R17	82Ω	½	C220055IB-820K	BTS-82	
R18	1000Ω	1	C220055IC-102K	BTA-1000	
R19	82Ω	½	C220055IB-820K	BTS-82	
R20	82Ω	½	C220055IB-820K	BTS-82	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	BENDIX PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	6.3VCT ②3.7A	460VCT .054ADC			C-217453-1	P-6472	P-4071 ①			

① Mount the same as original unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	BENDIX PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	6KΩ	3.5Ω	C217465	A-3850		S-3X ①			① Bend mounting tabs down. File out slots. Mount same as original unit.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	BENDIX PART No.	JENSEN PART No.	QUAM PART No.	
SP1	6"X9"	PM	3.5Ω	L-222081-1	ST-810 Mod. P69-V	69A2	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	BENDIX PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	11Ω		C216053-1				Includes slug; slug part # C215681-1
L2	RF Choke	25Ω		C215818-3	19-3860 ▲		4652▲	825 Microhenries; wound on 56KΩ resistor
L3	RF Coil	11Ω		C216051-1				Includes slug; slug part # C215681-1
L4	Osc. Coil	1.6Ω	3.7Ω	C216052-1				Includes slug; slug part # C215681-2
L5	Input IF	48Ω	57Ω	L291714-2 *	16-6752	BC-350	12-H1	
L6	Output IF	48Ω	35Ω	L291706-3 †	16-6754	BC-354	12-H6	
L7	Vibrator Hash Choke	0Ω		C215521-2			5221	10 Microhenries
L8	Fil. Choke	.2Ω		C215739-2	19-7100			128 Microhenries
L9	Fil. Choke	0Ω		A216015-1				

* Alternate Part # L291714-1, -3.
† Alternate Part # L291706-2, -4.
▲ Parallel with 56KΩ resistor.

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				BENDIX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	6.3V	115∿	C-222810-1	5301	859	5301	

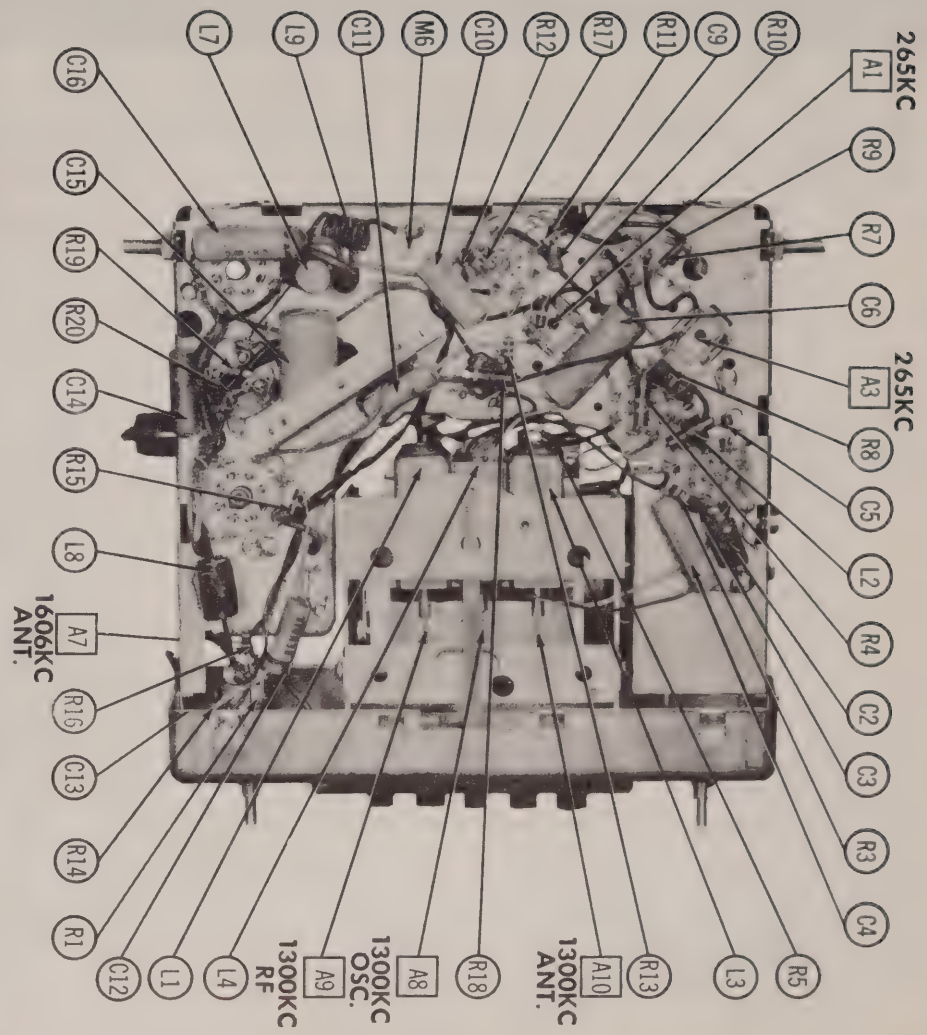
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			BENDIX PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	SFE	9A	C221613-9	C223081-2	30700 (SFE-9A)	155009	SFE 9	HRH

MISCELLANEOUS

ITEM No.	PART NAME	BENDIX PART No.	NOTES
M3	Dial light	C221319-2	# 55 bayonet
M4	Tuner assembly	R222469-4	
M5	Spark plate	A243398-1	(2) used(substitute C220267-1)
M6	Spark plate	A243398-2	(2) used(substitute C220267-2)
A5	Trimmer cap	C219057-1	Osc. (430-500 MMF)
A6	Trimmer Cap.	C219045-9	RF (4-75MMF)
A7	Trimmer Cap.	C219046-2	Ant. (4-75MMF)
	Knob	C208649-1	Assembly - tuning or volume
	Dial Glass	C233503-1	

CHASSIS—BOTTOM VIEW



ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
The negative terminal of a 7.2 voltage supply should be connected to the "A" lead. Connect the positive lead to chassis.
Turn the tuning control maximum counter clockwise.
The dial pointer should be approximately 1/4" to the left of the low frequency index mark on the dial. If necessary, reset the dial pointer to this position with the dial pointer adjustment cam.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Fig. 1.	High side thru dummy antenna (Fig.1) to antenna receptacle Low side to chassis.	265KC (400%Mod.)	High frequency end stop	Across voice coil	A1, A2, A3, A4	Adjust for maximum deflection.
				RF ALIGNMENT			
2.	Fig.1	High side thru dummy antenna (Fig.1) to antenna receptacle Low side to chassis.	1606KC	High frequency end stop	Across voice coil	A5, A6, A7	Adjust for maximum deflection. Continue alignment with step 1.
				RF ALIGNMENT WHEN TUNING CORE IS REPLACED			
3.	Fig. 1	High side thru dummy antenna (Fig.1) to antenna receptacle Low side to chassis.	1606KC	High frequency end stop	Across voice coil	A5, A6, A7	Position cores so that they remain well within the coil form, but do not extend inside the coil. Adjust for maximum deflection.
4.	"	"	1300KC	1300KC	"	A8, A9, A10	Adjust in order given for maximum deflection.
5.	"	"	1606KC	High frequency end stop	"	A5, A6, A7	Adjust in order given for maximum deflection. Repeat steps 4 and 5 until maximum output is obtained. Cement iron core screws to tuner core carriage.

SENSITIVITY CONTROL ADJUSTMENT

6. Adjust the sensitivity control (R2) for 100 milliwatts of noise at noisiest point in the band with volume control set for maximum volume.

CAR ANTENNA ALIGNMENT

7. With radio installed in car and antenna fully extended tune to a weak station near 1600KC and adjust A7 for maximum volume.

PUSH BUTTON ADJUSTMENT

Tune in a station manually. Loosen a selected pushbutton by turning not more than one turn in a counter clockwise direction. Press pushbutton all the way in and release . Tighten pushbutton by turning to the right. Repeat procedure for remaining pushbuttons.

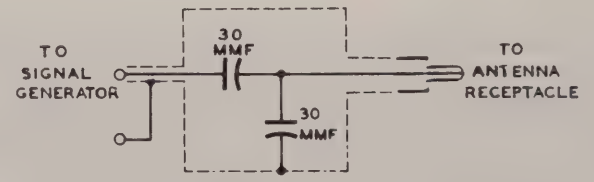
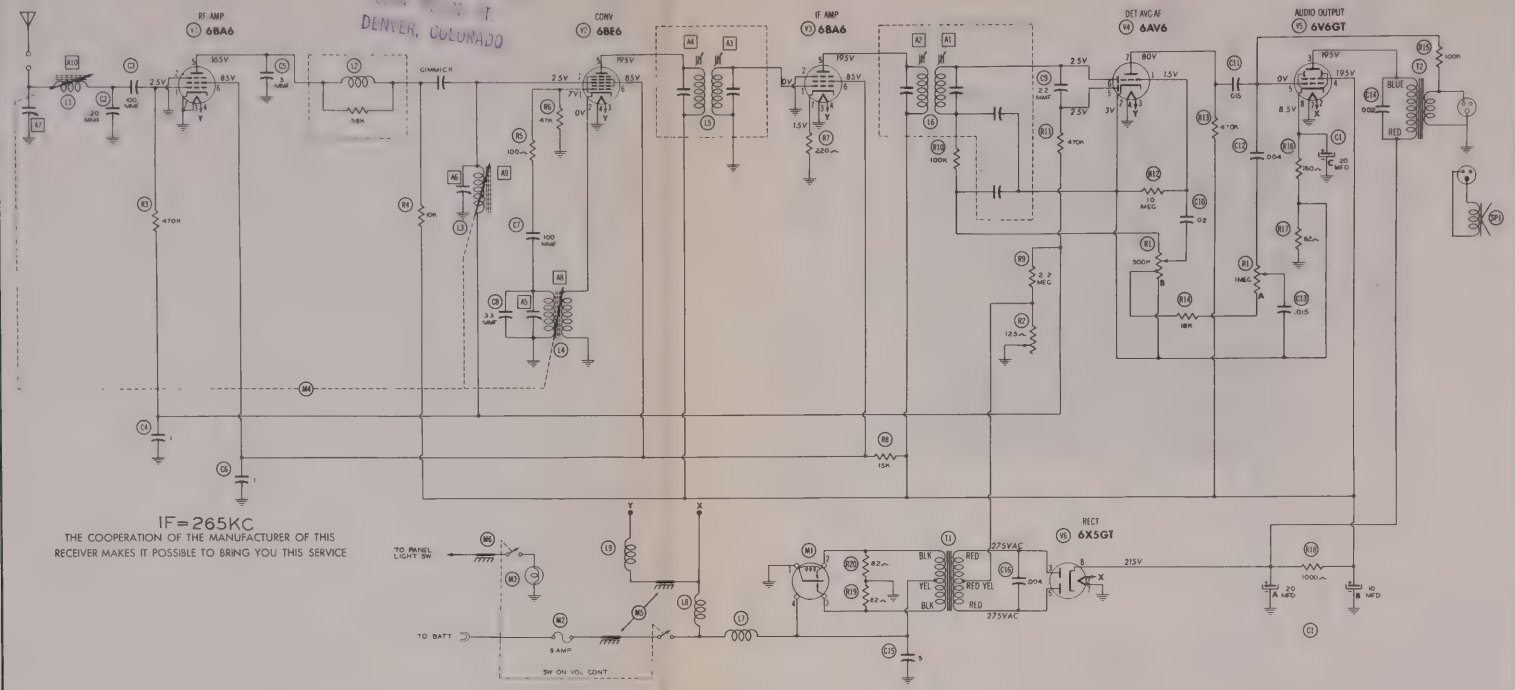


FIG. 1

DENVER, COLORADO



IF=265KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6BA6	2.7Meg	0Ω	0Ω	.4Ω	†1KΩ	†16KΩ	0Ω	
V 2	6BE6	47KΩ	1.5Ω	.4Ω	0Ω	†1KΩ	†16KΩ	2.2Meg	
V 3	6BA6	60Ω	0Ω	0Ω	.4Ω	†1KΩ	†16KΩ	220Ω	
V 4	6AV6	10Meg	82Ω	.4Ω	0Ω	2.7Meg	550KΩ	†470KΩ	
V 5	6V6GT	INF	.4Ω	†630Ω	†1KΩ	100KΩ	.7Ω	0Ω	260Ω
V 6	6X5GT	0Ω	.4Ω	375Ω	INF	415Ω	.4Ω	0Ω	5Meg

† MEASURED FROM PIN 8 OF V6

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt
2. Socket connections are shown as bottom view
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 6.3 volts for voltage readings.
5. Nominal tolerance on components ±10% unless marked otherwise. Due to variation of ± 10% in voltage and resistance readings
6. Volume control at maximum, no signal applied for voltage measurements

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MODEL 21M143U

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RETMA MEMBER

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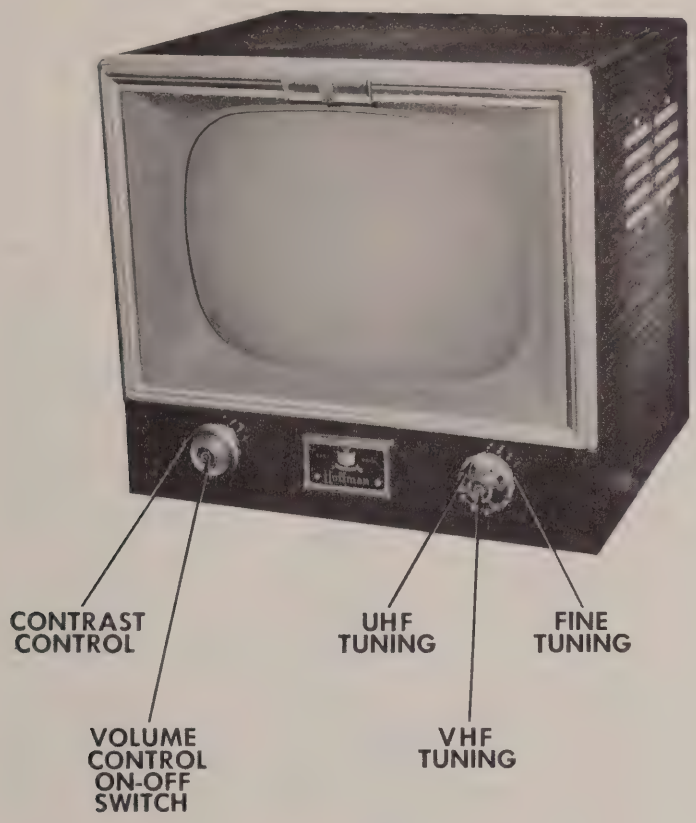

HOFFMAN MODEL 21M143U

TRADE NAME	Hoffman	MODELS	CHASSIS
		7B141, 7M140	300-17
		7B141U, 7M140U	300-17
		21B144, 21B318, 21B719, 21M143, 21M317, 21M718, 21P145, 21P720	300-21
		21B144U, 21B318U, 21B719U, 21M143U, 21M317U, 21M718U, 21P145U, 21P720U	300-21
MANUFACTURER	Hoffman Radio Corp., 6200 S. Avalon Blvd., Los Angeles 3, Calif.		
TYPE SET	Television Receiver		
TUBES	Twenty-one		
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING 1.42 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

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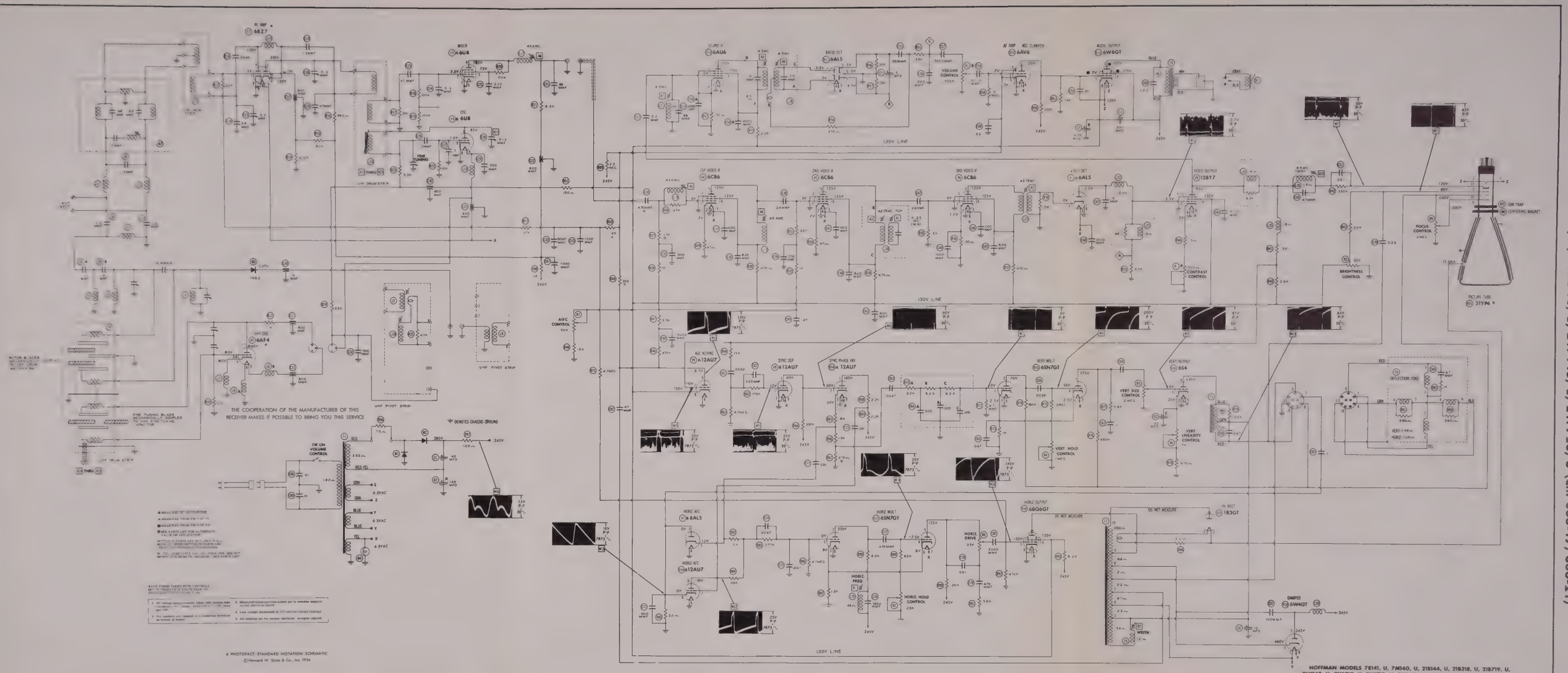
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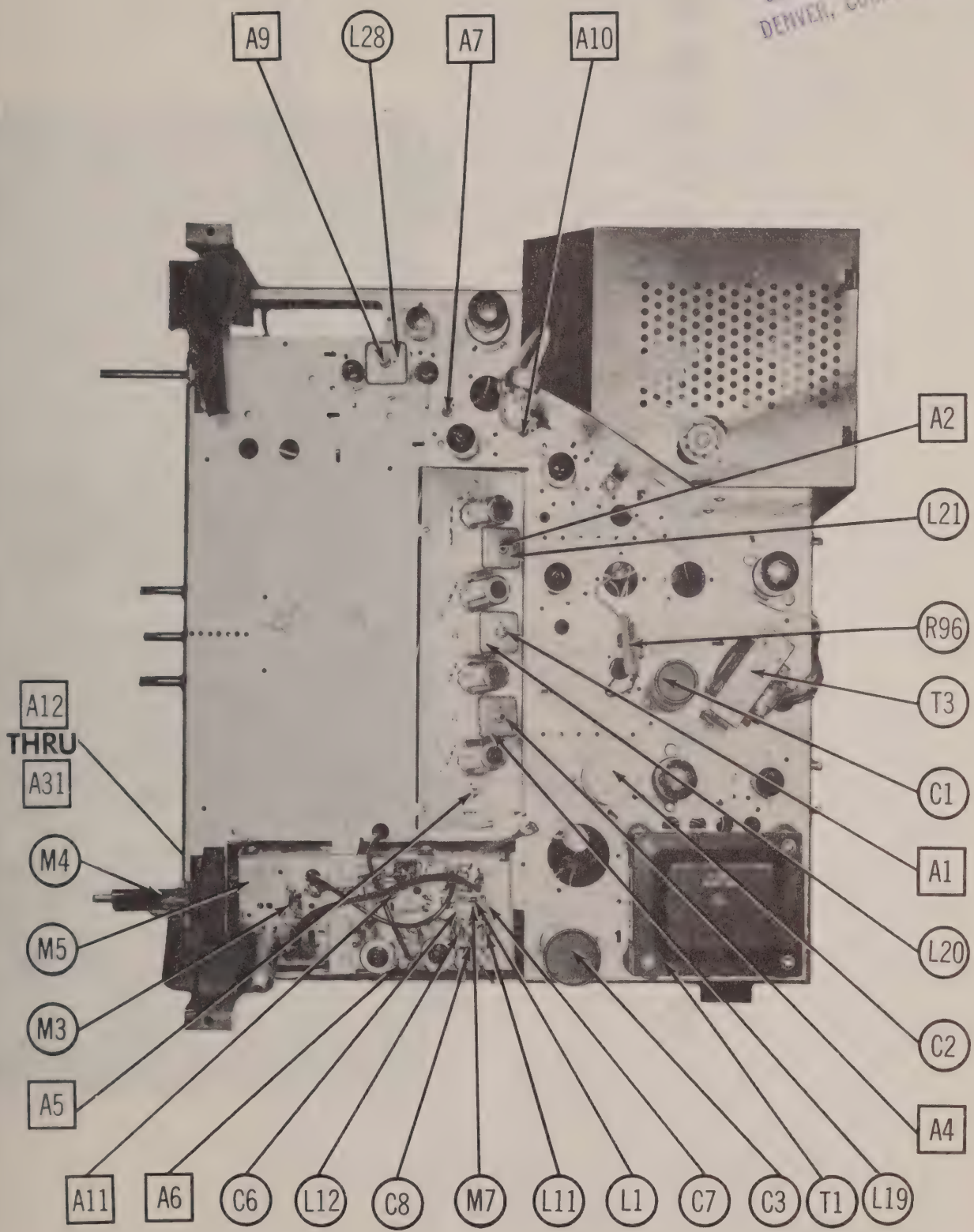
HOFFMAN MODELS 7B141, U, 7M140, U, 21B144, U, 21B318, U, 21B719, U, 21M143, U, 21M317, U, 21M718, U, 21P145, U, 21P720, U (Ch. 300-17, 300-21)

HOFFMAN MODELS 7B141, U, 7M140, U, 21B144, U, 21B318, U, 21B719, U, 21M143, U, 21M317, U, 21M718, U, 21P145, U, 21P720, U (Ch. 300-17, 300-21)

PROPERTY OF
L. F. CLARKSHIP
3024 WELTON ST
DENVER, COLORADO



CHASSIS TOP VIEW

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

PHOTOFACT SERVICE
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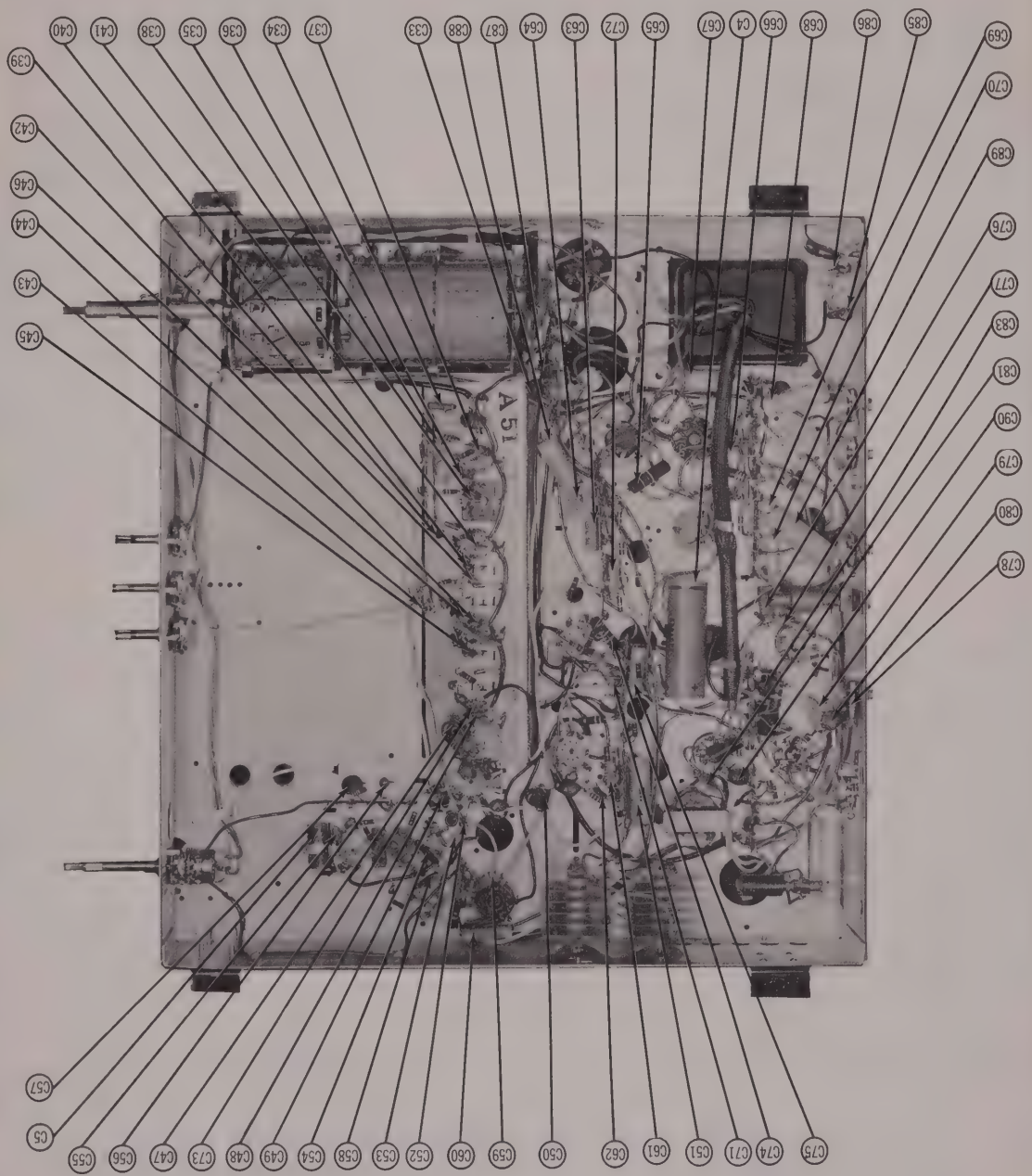
3644 W. [illegible] ST.
DENVER, COLORADO



TUBE PLACEMENT CHART

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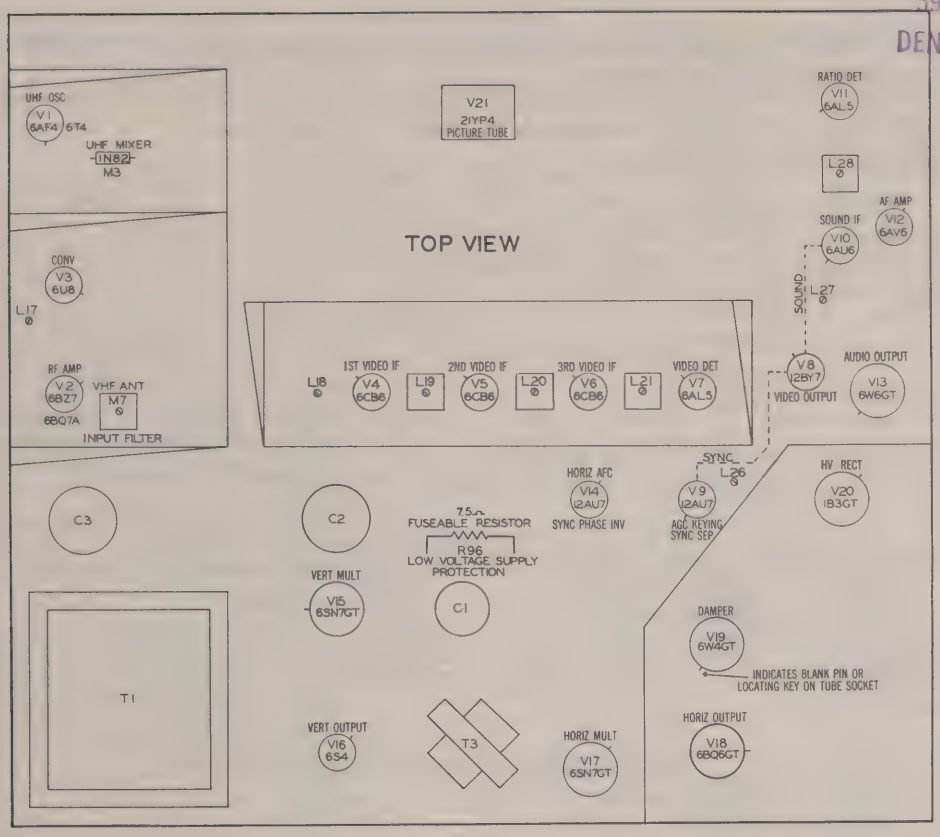

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - Selenium Rectifiers (M1 & M2)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V3, V4, V5, V6, V7, V8, V13 (V1 UHF only)
No pic, no sound, has snow - V2, V3, V4
No pic, has sound, has raster - V8, V21
Has pic, no sound - V10, V11, V12, V13
Overloaded picture - V9, V12

SYNC FAILURE
No vert. sync - V14, V15
No horiz. sync - V7, V14, V17
No vert. or horiz. sync - V9, V14

SWEEP FAILURE
No raster, has sound - V17, V18, V19, V20, V21
No vertical deflection - V15, V16
Poor vert. linearity or foldover - V15, V16
Poor horiz. linearity or foldover - V17, V18, V19
Narrow picture - V17, V18, V19, V20, M1, M2
Vert. off freq. - V14, V15
Horiz. off freq. - V7, V14, V17

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage shock hazard may be eliminated by removing the horizontal output tube (V18) or by biasing V18 with a -60 volts.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt battery to the ungrounded side of C89. Connect the positive lead to chassis.
Set contrast control to maximum contrast position.
Attenuate signal generator to maintain one volt at VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over converter tube (V3). Low side to chassis.	41.25MC (Unmod.)	Between any two VHF channels	DC probe thru 10KΩ to point (A). Common to chassis.	A1	Adjust for MINIMUM deflection.
2.	"	"	43.75MC	"	"	A2	Adjust for maximum deflection.
3.	"	"	42.75MC	"	"	A3	"
4.	"	"	45.4MC	"	"	A4	"
5.	"	"	43.0MC	"	"	A6	Temporarily adjust for MINIMUM deflection.
6.	"	"	"	"	"	A5	Adjust for maximum deflection.
7.	"	"	45.0MC	"	"	A6	Adjust for maximum deflection. Repeat steps 1 thru 7 until no further change is noted.

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Direct	High side to an ungrounded tube shield floating over converter tube (V3). Low side to chassis.	43.5MC (10MC Swp)	41.25MC 42.0MC 45.75MC	Between any two VHF channels	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		Check for response curve similar to Fig. 1. If necessary retouch A2, A3 and A4. Do not adjust A5 and A6 unless absolutely necessary. A4 positions 45.75MC marker, A3 positions 42.0MC marker, A2 affects tilt. Use only enough generator output to produce usable pattern on scope.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.005 MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Between any two VHF channels	DC probe thru 10KΩ to point (B). Common to chassis.	A7, A8	Attenuate generator to maintain from 4 to 7 volts at VTVM. Adjust for maximu m deflection.
10.	"	"	"	"	DC probe thru 10KΩ to point (C). Common to chassis.	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.005MFD	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Between any two VHF channels	Vert. Amp. thru 10KΩ to point (B). Low side to chassis.	A7, A8	Disconnect stabilizing capacitor C5. Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
10.	"	"	"	"	"	Vert. Amp. thru 10KΩ to point (C). Low side to chassis.	A9	Reconnect stabilizing capacitor C5. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines.

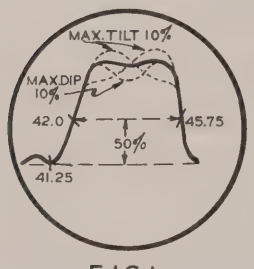

FIG.1

FIG.2

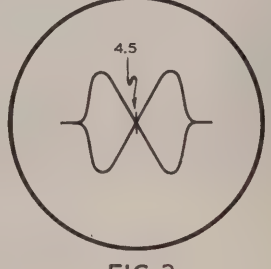

FIG.3

ALIGNMENT INSTRUCTIONS (cont)

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4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
11.	.005MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Between any two VHF channels	DC probe thru detector (Fig.4) to pin 11 (cathode) of picture tube. Common to chassis.	A10	Adjust for MINIMUM deflection.

VHF OSCILLATOR ALIGNMENT

Replace V3 tube shield to normal position.
Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels, it may be possible to correct them in one step using A11. It should be noted that this is an all channel oscillator circuit adjustment and should not be adjusted for any individual channel.
Switch tuner to VHF position and remove tuner knobs. With the fine tuning control near the center of its range the VHF channel oscillator adjustment screws are accessible thru a hole just above and slightly to the left of the channel switch shaft. This hole extends thru the UHF tuner only when the channel switch is set to VHF position. The correct VHF channel adjustment screw is accessible thru this hole as the channel switch is turned to each channel. Leave bias connected as under video IF alignment and connect a jumper from the ungrounded side of C89 to the tuner AGC terminal.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A12	Adjust to place sound marker in trap notch as in Fig. 5. Video marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A13	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A14	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A15	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A16	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A17	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A18	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A19	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A20	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A21	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A22	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A23	

VHF RF AND MIXER ALIGNMENT

The VHF RF and Mixer portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver should not be required in the field.

UHF OSCILLATOR ALIGNMENT

Switch tuner to UHF and remove tuner knobs the UHF channel oscillator adjustment screws are reached thru a hole just above and slightly to the left of the channel switch shaft. The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Leave the bias connected as under VHF oscillator alignment.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	473MC (10MC Swp)	471.25MC 475.75MC	14	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A24	Adjust to place sound marker in trap notch as in Fig. 5. Video marker should be at 50%.
			515MC (10MC Swp)	513.25MC 517.75MC	21		A25	
			575MC (10MC Swp)	573.25MC 577.75MC	31		A26	
			635MC (10MC Swp)	633.25MC 637.75MC	41		A27	
			695MC (10MC Swp)	693.25MC 697.75MC	51		A28	
			755MC (10MC Swp)	753.25MC 757.75MC	61		A29	
			815MC (10MC Swp)	813.25MC 817.75MC	71		A30	
			875MC (10MC Swp)	873.25MC 877.75MC	81		A31	

UHF, RF AND MIXER ALIGNMENT

The UHF RF and Mixer portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver should not be required in the field.

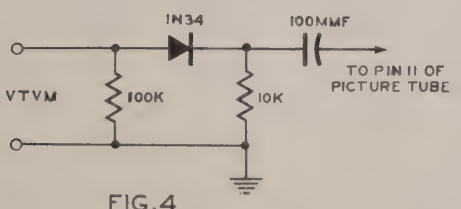


FIG.4

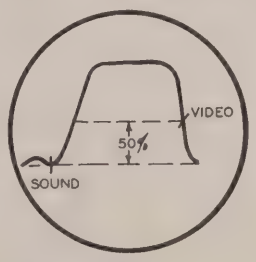


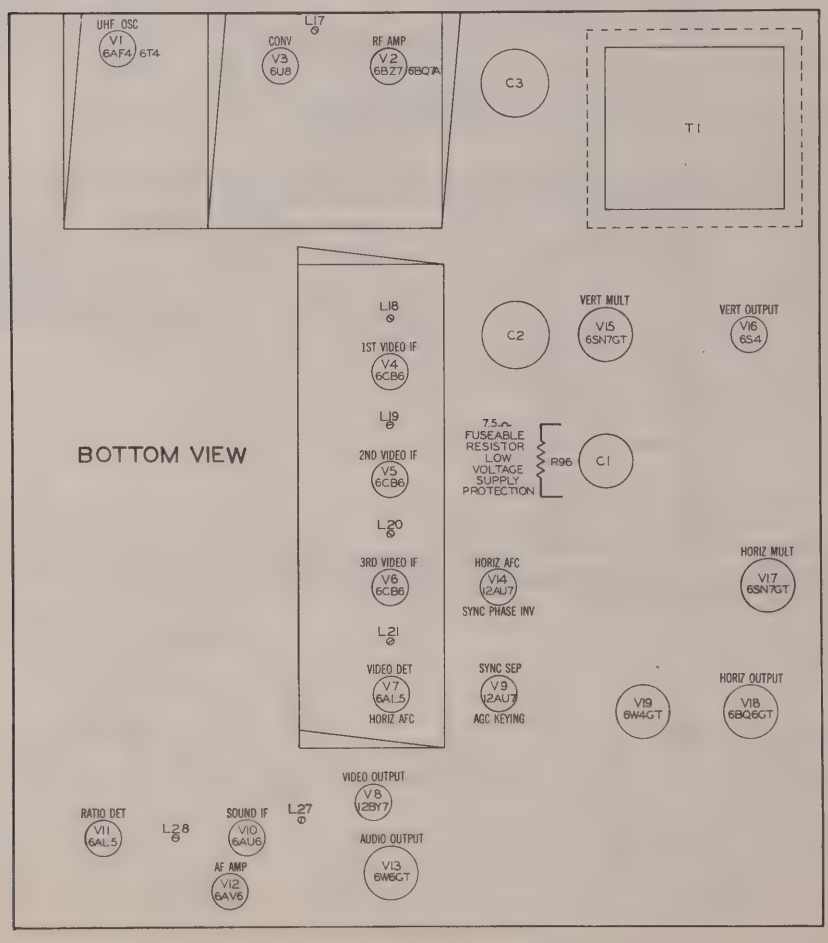
FIG.5

HOFFMAN MODELS 7B141, U, 7M140, U, 21B144, U, 21B318, U, 21B719, U, 21M143, U, 21M317, U, 21M718, U, 21P145, U, 21P720, U (Ch. 300-17, 300-21)

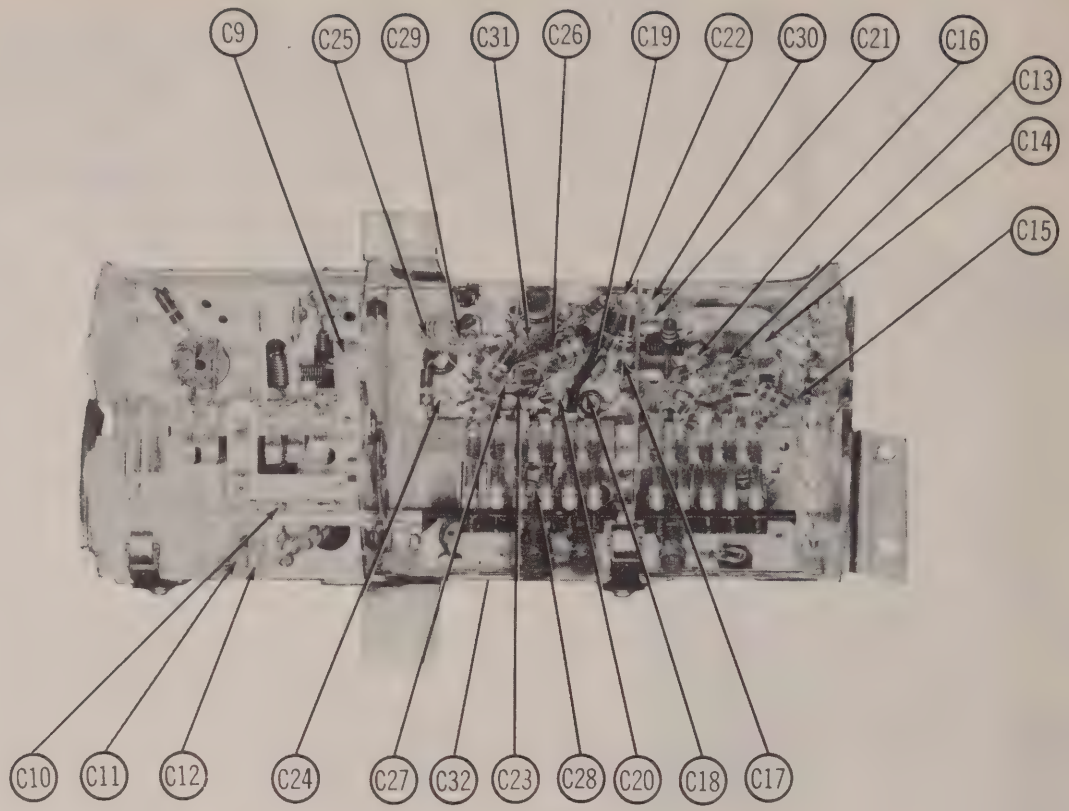
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AF4	■▲4.5KΩ	10KΩ	.1Ω	0Ω	0Ω	10KΩ	■▲4.5KΩ		
V 2	6BZ7	†1.7KΩ	†140KΩ	INF	0Ω	.1Ω	INF	800KΩ	0Ω	0Ω
V 3	6U8	▲3.5KΩ	200KΩ	†110KΩ	.1Ω	0Ω	†9.2KΩ	0Ω	0Ω	10KΩ
V 4	6CB6	50KΩ	47Ω	.1Ω	0Ω	▲470Ω	▲470Ω	0Ω		
V 5	6CB6	50KΩ	47Ω	.1Ω	0Ω	▲470Ω	▲470Ω	0Ω		
V 6	6CB6	15KΩ	150Ω	.1Ω	0Ω	▲470Ω	▲470Ω	0Ω		
V 7	6AL5	.1Ω	22Ω	.1Ω	0Ω	5.3Meg	0Ω	4.7KΩ		
V 8	12BY7	150Ω	4.7KΩ	0Ω	0Ω	0Ω	.1Ω	▲4.8KΩ	▲0Ω	0Ω
V 9	12AU7	†330KΩ	5.2Meg	0Ω	0Ω	0Ω	500KΩ	▲3.3KΩ	▲0Ω	.1Ω
V 10	6AU6	1Ω	150Ω	.1Ω	0Ω	▲2.2KΩ	▲2.2KΩ	150Ω		
V 11	6AL5	INF	INF	.1Ω	0Ω	10KΩ	0Ω	10KΩ		
V 12	6AV6	10Meg	0Ω	0Ω	.1Ω	650KΩ	650KΩ	†16KΩ		
V 13	6W6GT	INF	▲0Ω	†300Ω	†120Ω	18KΩ	INF	▲.1Ω	22KΩ	
V 14	12AU7	†4.5KΩ	†330KΩ	4KΩ	0Ω	0Ω	5.3Meg	5.3Meg	22Ω	.1Ω
V 15	6SN7GT	4.7Meg	▲180KΩ	1KΩ	1.7Meg	▲680KΩ	1KΩ	.1Ω	0Ω	
V 16	6S4	INF	2.6KΩ	1.2Meg	0Ω	.1Ω	1.2Meg	INF	INF	▲1.9KΩ
V 17	6SN7GT	4.7Meg	†8.4KΩ	1.5KΩ	100KΩ	†120KΩ	1.5KΩ	.1Ω	0Ω	
V 18	6BQ6GT	750KΩ	0Ω	▲32Ω	▲0Ω	450KΩ	5.6KΩ	.1Ω	0Ω	TOP CAP ▲19Ω
V 19	6W4GT	INF	INF	1.7Meg	INF	†120Ω	▲38Ω	▲33Ω	▲33Ω	
V 20	1B3GT		PINS	1 -8	HAVE	INF	RESISTANCE			TOP CAP ▲470Ω
V 21	21YP4A	▲.1Ω	▲40KΩ	PIN 6 ▲600KΩ	PIN 10 ▲ 38Ω	PIN 11 ▲ 330KΩ	PIN 12 ▲ 0Ω			

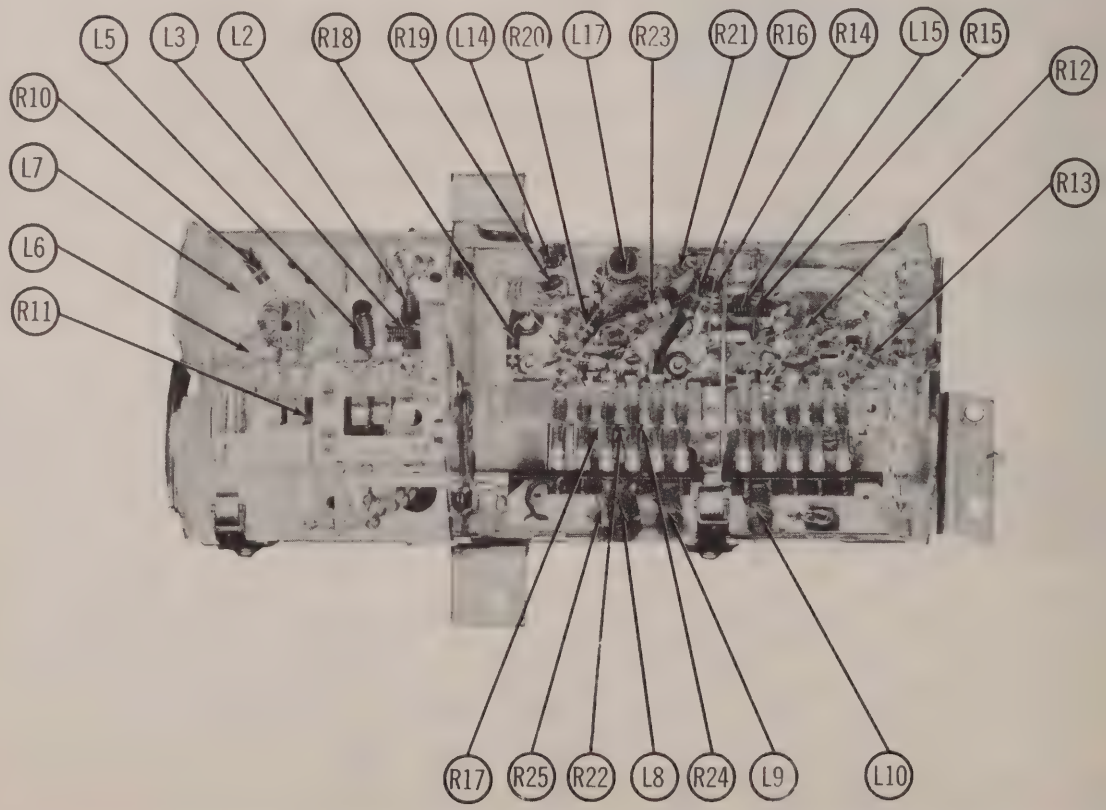
■ MEASURED IN UHF POSITION
▲ MEASURED FROM 130V LINE
† MEASURED FROM OUTPUT OF M2
▲ MEASURED FROM PIN 3 OF V19



TUBE PLACEMENT CHART



RF TUNER-BOTTOM VIEW CAPACITOR IDENTIFICATION



RF TUNER-BOTTOM VIEW -RESISTOR AND INDUCTOR IDENTIFICATION

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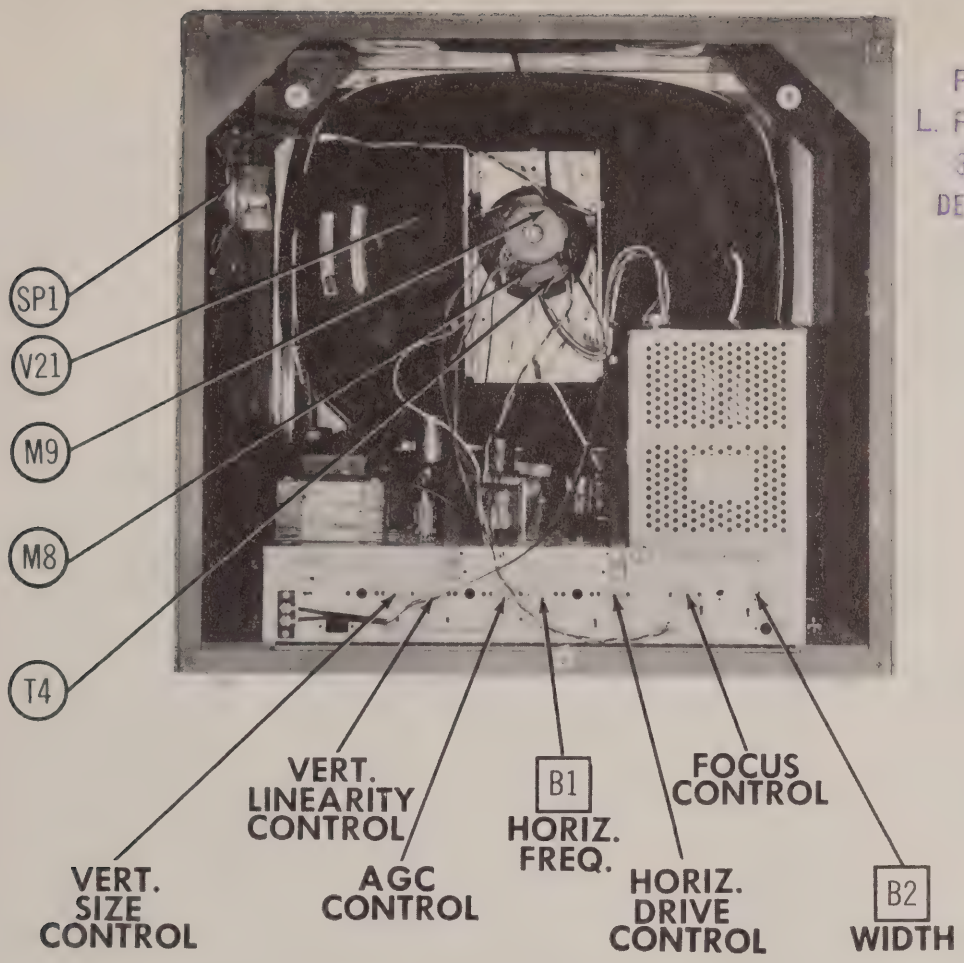
3924 [illegible] ST
DENVER, COLORADO



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Rotate the horizontal drive control counter clockwise as far as possible without the presence of vertical white lines or compression near the center of the picture.

Set the horizontal hold control to its mid-range position.

Adjust the horizontal frequency slug (B1) counter clockwise while switching on and off channel until picture loses sync. Tune B1 clockwise and note the number of diagonal bars just before sync pull-in. There should be not less than 2 bars if the horizontal section is operating normally. Continue turning B1 clockwise, while switching on and off channel, until sync is lost again, then turn B1 counter clockwise, and note the point where sync pull-in occurs.

Turn B1 an additional half turn counter clockwise.

Adjust the width slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V17, V18 and V19. Check adjustment of the horizontal drive control and B2. Check waveform W15.

If Satisfactory	If Unsatisfactory
Check T2, T4A, C4 and other associated circuit components.	Check C77, C78, C80, R8, R92, R90 and other associated circuit components.

DRIVE LINES

Check adjustment of the horizontal drive control. Check by substitution V17, V18 and V19. Check T2, T4A, C77, C78, C80, and other associated circuit components.

COMPRESSED LEFT SIDE

Check by substitution V17, V18 and V19. Check components associated with the horizontal output and damper stages especially T2 and T4A.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V17, V18 and V19. Check T2 and T4A. Check C75 for open.

XMAS TREE EFFECT

Substitute V17. Check C77, C76, L29 and other associated circuit com- for failure or change of value.

VERTICAL

LOSS OF SWEEP

Check by substitution V15 and V16. Check waveform W9.

If Satisfactory	If Unsatisfactory
Check T3, T4B, R6, R78 and other associated circuit components.	Check R5, C68, R74, R76, C66 and other associated components.

INSUFFICIENT SWEEP

Check adjustment of vertical size and linearity controls. Proceed as outlined under "Loss of Sweep".

COMPRESSED AT BOTTOM

Check by substitution V15 and V16. Check T3, T4B, C2C and other associated circuit components.

COMPRESSED AT TOP

Check by substitution V15 and V16. Check C68, C66, C65, C67 R76, R5 and other associated circuit components for failure or change of value.

FOLDS

Check by substitution V15 and V16. Check associated circuit components for failure or change of value.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V9 and V14. Check components associated with V9B and V14A for failure or change of value.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Check by substitution V9, V14 and V15. Check waveform W7.

If Satisfactory	If Unsatisfactory
Check components associated with V15 especially C66, R74, and R72.	Check vertical integrator network and other associated components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V7, V14 and V17. Check waveform W12.

If Satisfactory	If Unsatisfactory
Check components associated with V17 especially C76, C77, L29, R87, R88 and R90.	Check components associated with V7B and V14B especially C72 and C71.

HORIZONTAL BENDING

Check by substitution V7, V14, V17 and V18. Check horizontal AFC filter network for component failure or change of value.

VIDEO

LOSS OF VIDEO

Check C51, picture tube and other associated circuit components for failure.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best picture and sound. Adjust A10 for minimum 4.5MC beat. Check video IF alignment.

POOR CONTRAST

Check by substitution V7 and V8. Check contrast control, picture tube and other associated circuit components.

NEGATIVE PIX

Check by substitution V7, V8 and V9. Check AGC network. Check picture tube and other associated circuit components.

SMEAR

Check by substitution V7 and V8. Check L22, L23, L24, L25, R41, R42, C51, picture tube and other associated circuit components.

WIDE BLACK BAR ACROSS PICTURE

Check V2, V3, V4, V5, V6, V7 and V8 for heater to cathode leakage. In case of UHF check V1. Check B+ filter capacitors for open.

AUDIO

WEAK OR NO SOUND

Check by substitution V10, V11, V12 and V13. Check stages V12 and V13 using audio signal generator. Apply signal across R58.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF alignment and components.	Check components associated with V12 and V13 especially T6

BUZZ

Adjust tuner fine tuning for best picture with minimum buzz. Adjust A9 for minimum buzz. If still unsatisfactory, substitute V9 and realign ratio detector. Check C5.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

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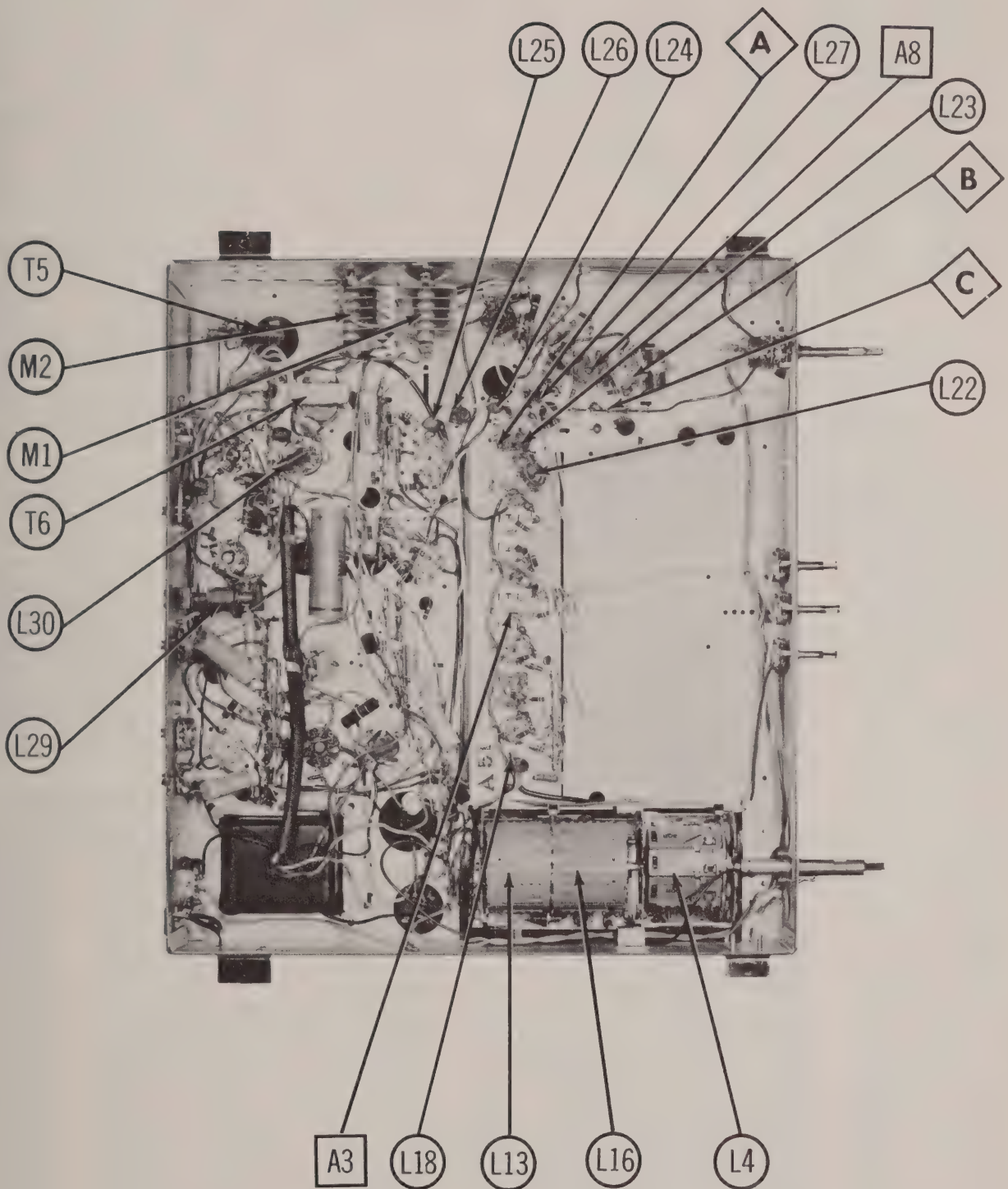


CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: HOFFMAN PART No.	STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1A	UHF Oscillator	6AF4	6AF4	7DK	
B	UHF Oscillator	6T4	6T4	7DK	
V2A	RF Amplifier	6BZ7	6BZ7	9AJ	
B	RF Amplifier	6BQ7A	6BQ7A	9AJ	
V3	Converter	6U8	6U8	9AE	
V4	1st Video IF Amp.	6CB6	6CB6	7CM	
V5	2nd Video IF Amp.	6CB6	6CB6	7CM	
V6	3rd Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Detector - Horiz. AFC	6AL5	6AL5	6BT	
V8	Video Output	12BY7	12BY7	9BF	
V9	AGC Keying - Sync Separator	12AU7	12AU7	9A	
V10	Sound IF Amp.	6AU6	6AU6	7BK	
V11	Ratio Detector	6AL5	6AL5	6BT	
V12	A F Amplifier	6AV6	6AV6	7BT	
V13	Audio Output	6W6GT	6W6GT	7S	
V14	Sync Phase Inv. - Horiz. AFC	12AU7	12AU7	9A	
V15	Vert. Mult.	6SN7GT	6SN7GT	8BD	
V16	Vert. Output	6S4	6S4	9AC	
V17	Horiz. Mult.	6SN7GT	6SN7GT	9BD	
V18	Horiz. Output	6BQ6GT	6BQ6GT	8AM	
V19	Damper	6W6GT	6W6GT	4CG	
V20	HV Rectifier	1B3GT	1B3GT	3C	

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: HOFFMAN PART No	SYLVANIA PART No.	GENERAL ELECTRIC PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V21A	21YP4	21TP4	21YP4	21YP4	12L	① Circuit changes necessary
		21TP4A			12L	
		21AFP4 ①			12M	
B	17HP4	17HP4	17HP4	17HP4	12L	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP	VOLT	HOFFMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1	140	150	4345	AFHBL-70		XA004		FP117	R1267	
C2A	a 140	150	4345	AFH4-135		[XB008		FP216. 3	TVL-4559	
B	a 200	150				SR3015		TC36		
C	a 30	50								
C3	200	150	4357	AFH8 1-71		XB008		FP-216.1	TVL-1431	
C4	10	600	4353	PRS600/10		BRHY610		TC92	R1223/6	
C5	5	50	4309	PRS150/6		BR550		TC50	TVA-1303	
C6	2. 2			SI3. 2NP0	TCZ-2. 2		NP0 K-3R2		5TCCB-V22	
C7	2. 2			SI2. 2NP0	TCZ-2. 2		NP0 K-3R2		5TCCB-V22	
C8	1. 5			SIL 5NP0	TCZ-1. 5		NP0 K-1R5	ZT-5515	5TCCB-V15	
C8A	]									
B	]			SI9-3				CT565A		
C10	10									
C11	800			EF-001	MFT-1000				503C-D1	
C12	800			EF-001	MFT-1000				503C-D1	
C13	. 5-3				SI9-3			CT-565A		
C14	6. 8			SI6. 8NP0	TCZ-6. 8		NP0K-6R8	ZT-5568	5TCCB-V68	
C15	1500			BPD-0015	DD-152	TM5D15	501-0015	DC-5215	5HK-D15	
C16	3			SI3NP0	TCZ-3		NP0K-030		5TCCB-V3	
C17	800			EF-001	MFT-1000				503C-D1	
C18	5-3				SI9-3			CT565A		
C19	1. 5			SIL 5NP0	TCZ-1. 5		NP0K-1R5	ZT-5516	5TCCB-V15	
C20	47			BPD-000047	D6-470		GPIK-470	UC-5447	5GA-Q47	
C21	800			EF-001	MFT-1000				503C-D1	
C22	800			EF-001	MFT-1000					
C23	47									
C24	3			SI9-3				CT565A		
C25	R30			BPD-00023	D6-221		GP2K-221	UC-5223	5GA-T22	
C26	10			SI10NT50	TCN-10		NT50K-100	NT-541	5TCN-Q1	
C27	5									
C28	. 5 -3				SI9-3			CT-565A		
C29	1500			BPD-0015	DD-152	TM5D15	501-0015	DC-5215	5HK-D15	
C30	800			EF-001	MFT-1000				503C-D1	
C31	39			SI6NT50	TCN-68				5TCU -Q68	
C32	1500			BPD-0015	DD-152	TM5D15	501-0015	DC-5215	5HK-D15	
C33	5000		4729	BPD-005	DD-502	TM5D5	5 11-005	DC-525	5HK-D5	
C34	470			SI470	D6-471		GP2K-470	UC-5347	5GA-T47	Note 1
C35	1000		14031	BPD-001	DD-102	TM5D1	511-001	DC-521	5HK-D1	
C36	250		14054	SI250	D6-251				5GA-T32	
C37	1000		14031	BPD-001	DD-102	TM5D1	511-001	DC-521	5HK-D1	
C38	24		14056	SI24			GPIK-240			
C39	1000		14031	BPD-001	DD-102	TM5D1	511-001	DC-521	5HK-D1	
C40	250		14054	SI250	D6-251				5GA-T32	
C41	1000		14031	BPD-001	DD-102	TM5D1	511-001	DC-521	5HK-D1	
C42	24		14056	SI24			GPIK-240			
C43	1000		14031	BPD-001	DD-102	TM5D1	511-001	DC-521	5HK-D1	
C44	1000		14031	BPD-001	DD-102	TM5D1	511-001	DC-521	5HK-D1	
C45	250		14054	SI250	D6-251				5GA-T32	
C46	1000		14031	BPD-001	DD-102	TM5D1	511-001	DC-521	5HK-D1	
C47	15		14058	SI15	D6-150		GPIK-150	UC-541	5GA-Q1	
C48	1000		14031	BPD-001	DD-102	TM5D1	511-001	DC-521	5HK-D1	
C49	5000		4729	BPD-005	DD-502	TM5D5	511-005	DC-525	5HK-D5	
C50	47			SI47	D6-470		GPIK-470	UC-5447	5GA-Q47	
C51	. 22	300	6131	PTS6-22		P72P22		PT4022	2TM-P22	
C52	2. 2		4069	SI2. 2NP0	TCZ-2. 2		NP0K-2R2		5TCCB-V22	
C53	56		4046							
C54	4000		4038	BPD-X2004	DD-403	TM5DD4	523-004	DCD-524	5HK-2D4	
B	4000				DD-402					
C56	330		4068	SI330	D6-331		GP2K-330	UC-5333	5GA-T33	
C56	1000		14031	BPD-001	DD-102	TM5D1	511-001	DC-521	5HK-D1	
C57	5000		4729	BPD-005	DD-502	TM5D5	511-005	DC-525	5HK-D5	

CAPACITORS (cont)

ITEM No.	RATING: CAP	VOLT	HOFFMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C58	5000		4029	BPD-005	DD-502	TM5D5	511-005	DC-525	5HK-D5	
C59	.01	400	4143	P488-01		DD-103	PTE5E1	GP2-333-103	PT6231	6TM-D39
C60	. 022	600	4124	P668-022			PTE5E22		PT6122	6TM-S32
C61	.0022	400	4138							
C62	220		4026	SI220	D6-221		GPIK-221	UC-5323	5GA-T22	
C63	0047	400	4127	P488-0047	D6-472	PTE4D47	GP2-333-472	PT4247	4TM-D22	
C64A	2000							DC-523		
B	5000		⋄ .9695	⋄ PA-110	⋄ PC-10	⋄ 115TM1	⋄ 1405-01	DC-526	⋄ 101C1	
C	5000							DC-525		
C65	.047	200	4158							
C66	.0037	600	14113	P888-0039	D6-392	PTS5D39	GP2-333-392	PT6239	6TM-D39	
C67	.1	600	4144	P686-1		PTE6P1		PT601	6TM-P1	
C68	.1	600	4144	P686-1		PTE6P1		PT601	6TM-P1	
C69	.047	600	4133	P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C70	.022	600	4124	P688-022		PTE6S22		PT6122	6TM-S32	
C71	.001	400	4175	P688-001	D6-102	PTE6D1	GP2L-102	PT421	4TM-D1	
C72	.001	400	4175	P688-001	D6-102	PTE6D1	GP2L-102	PT421	4TM-D1	
C73	1000		14031	BPD-001	DD-102	TM5D1	511-001	DC-521	5HK-D1	
C74	.0047	400	4135							
C75	.047	200	4158							
C76	3000	500	4085	1464-004		1DR5D4		MCB463	MS-24	
C77	470	500	14009	1469-0005		5R5T5		MCB245	MS-35	
C78	.001	400	4175	P488-001	D6-102	PTE4D1	GP2L-103	PT421	4TM-D1	
C79	470	500	14009	1469-0005		5R5T5		MCB245	MS-35	
C80	5000		4029	BPD-005	DD-502	TM5D5	511-005	DC-525	5HK-D5	
C81	100	3000	14053	HVD30-0001			PTE6D1	3KV-101	30GA-T1	
C82	47	3000	14045	HVD30-000047				3KV-470	30GA-Q5	
C83	.1	600	4144	P686-1	DF-104	PTE6P1		PT601	6TM-P1	
C84	47	3000	14045	HVD30-000047				3KV-470	30GA-Q5	
C85	.01	600	14069	689ZX-01		PJS5I		PT611	6TM-S1	
C86	.01	600	14069	689ZX-01		PJS5I		PT611	6TM-S1	
C87	5000		4029	BPD-005	DD-502	TM5D5	511-005 ⋄	DC-525	5HK-D5	
C88	.22	200	4131	P488-22		PTS4P22		PT4022	2TM-P22	
C89	.47	200	4172	P288-47		P72P5		PT4047	2TM-P47	
C90	5000		4029	BPD-005	DD-502	TM5D5	511-005	DC-525	5HK-D5	

Note 1. Some models use .001 MFD in this application (Part No. 14031).
⋄ Items C64A, C64B, C64C, R70A, R70B, R70C are combined in one unit.

CONTROLS

ITEM No	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: HOFFMAN PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500Ω		H6810	QJ-537				Contrast (Panel)
B	500KΩ		Not Req.					Vol. & Sw. tapped ⑤150KΩ (Rear)
R2A	25KΩ		H4889	Q11-190	AG-40-6	AB-26	U-39	Horiz. Hold
B	Shaft		Not Req.	Not R eq.	KS8-3	AK-4	Not Req.	Attach to R2A
R3A	50KΩ		H4867	Q11-123	AG-44-8	AB-31	U-35	Brightness
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R3A
R4A	1 Meg		H4898	Q11-137	AG-61-8	AB-69	U-54	Vert. Hold
B	Shaft		Not Req.	Not Req.	KS8- 3	AK-4	Not Req.	Attach to R4A
R5A	2 Meg		H4664	Q11-139	AG-63-8	AB-75	SU-56	Vert. Size
B	Shaft		Not Req.	Not R eq.	FK8-1/4	AK-1	Not Req.	Attach to R5A
R6A	5000Ω		H4865	Q11-114	AG-19-8	AB-10	SU-14	Vert. Linearity
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-1	Not Req.	Attach to R6A
R7A	50KΩ		H4853	Q11-123	AG-44-8	AB-31	SU-35	AGC
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-1	Not Req.	Attach to R7A
R8A	25KΩ		H4889	Q11-120	AG-40-8	AB-26	SU-39	Horiz. Drive
B	Shaft		Not Re q.	Not Req.	FK8-1/4	AK-1	Not Req.	Attach to R8A
R9A	2 Meg		H4864	Q11-139	AG-63-8	AB-75	SU-56	Focus
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-1	Not Req.	Attach to R9A

RESISTORS

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: HOFFMAN PART No.	IRC PART No.	NOTES
R10	10KΩ			BTS-10K	
R11	1000Ω			BTS-1000	
R12	22KΩ			BTS-22K	
R13	47KΩ			BTS-47K	
R14	270KΩ			BTS-270K	
R15	180KΩ			BTS-180K	
R16	680Ω			BTS-680	
R17	15KΩ			BTS-15K	
R18	100KΩ			BTS-100K	
R19	100KΩ			BTS-100K	
R20	100KΩ			BTS-100K	
R21	8200Ω			BTS-8200	
R22	10KΩ			BTS-10K	
R23	3300Ω			BTA-3300	
R24	33KΩ			BTS-33K	
R25	4700Ω			BTS-4700	
R26	47KΩ		4559	BTS-47K	
R27	4700Ω		4578	BTS-4700	Note 1
R28	1000Ω		4542	BTS-1000	
R29	47Ω		4639	BTS-47	
R30	470Ω		4664	BTS-470	
R31	22KΩ		4628	BTS-22K	
R32	1000Ω		4542	BTS-1000	
R33	47Ω		4639	BTS-47	
R34	470Ω		4664	BTS-470	
R35	15KΩ 5%		4619	BTS-15K 5%	
R36	150Ω		4616	BTS-150	
R37	470Ω		4664	BTS-470	
R38	15KΩ		4619	BTS-15K	
R39	4700Ω		4578	BTS-4700	
R40	33Ω		4656	BTS-33	
R41	1500Ω 5%		4610	BTS-1500 5%	
R42	330KΩ		4677	BTS-330K	
R43	22KΩ		4501	BTS-22K	
R44	15KΩ		4619	BTS-15K	
R45	3300Ω		4612	BTA- 3300	
R46	470KΩ		4506	BTS-470K	
R47	3300Ω		24541	BTS-3300	
R48	15KΩ		4531	BTS-15K	
R49	330KΩ		24532	BTS-330K	

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: HOFFMAN PART No.	IRC PART No.	NOTES
R50	120KΩ		4543	BTS-120K	
R51	150Ω		4616	BTS-150	
R52	150Ω		4616	BTS-150	
R53	2200Ω		4650	BTS-2200	
R54	270Ω		4663	BTS-270	
R55	33KΩ		4586	BTS-33K	
R56	10KΩ		4597	BTS-10K	
R57	10KΩ		4597	BTS-10K	
R58	10Meg		4505	BTS-10Meg	
R59	20KΩ 5%	1	24610	BTA-20K 5%	
R60	2. 2Meg 5%	½	24620	BTS-2. 2Meg 5%	
R61	24KΩ 5%	1	24616	BTA-24K 5%	
R62	470KΩ		4622	BTS-470K	
R63	4. 7Meg		4544	BTS-4. 7Meg	
R64	330KΩ		4677	BTS-330K	
R65	1800Ω 5%		24617	BTS-1800 5%	
R66	1800Ω 5%		24617	BTS-1800 5%	
R67	270Ω		4549	BTS-270	Note 2
R68	2200Ω		24525	BTS-2200	
R69	2200Ω		24525	BTS-2200	
R70A	22K Ω			BTS-22K	
B	8200Ω		⋄ 9695	BTS-8200	
C	8200Ω			BTS-8200	
R71	4. 7Meg		24659	BTS-4. 7Meg	
R72	4. 7Meg		24659	BTS-4. 7Meg	
R73	1000Ω		4659	BTS-1000	
R74	1.8ΩKΩ		24507	BTA-180K	
R75	2. 2Meg		24593	BTS-2. 2Meg	
R76	680KΩ		24571	BTA-680K	
R77	5600Ω		4629	BTS-5600	
R78	470Ω		4664	BTS-470	
R79	150KΩ		24697	BTA-150K	
R80	560Ω		58052	BTS-560	
R81	560Ω		58052	BTS-560	
R82	1000Ω			BTS-1000	
R83	100KΩ		4571	BTS-100K	
R84	100KΩ		4571	BTS-100K	
R85	470KΩ		4622	BTS-470K	
R86	4. 7Meg		4544	BTS-4. 7Meg	

RESISTORS (cont)

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: HOFFMAN PART No.	IRC PART No.	NOTES
R87	1500Ω 5%	1	4610	BTS-1500 5%	
R88	8200Ω	1	4651	BTS-8200	
R89	82KΩ	1	24670	BTS-82K	
R90	120KΩ	1	4548	BTS-120K	
R91	5600Ω	1	4629	BTS-5600	
R92	470KΩ	1	4722	BTS-470K	
R93	8200Ω	2	24580	BTB-8200	
R94	2. 2Ω	1	4735		
R95	22Ω	2	14529		
R96	7. 5Ω	5	4762		
R97	120Ω	10	4772		
R98	1000Ω	1		BTS-1000	

Note 1. Some models may use a 10KΩ resistor in this application.
Note 2. Some models may use a 390Ω resistor in this application.
⋄ Items R70A, R70B, R70C, C64A, C64B, C64C are combined in one unit.

TRANSFORMER (ISOLATION)

ITEM No.	RATING: PRI.	SEC. 1	SEC. 2	REPLACEMENT DATA: HOFFMAN PART No	Stancor PART No	Merit PART No	Triad PART No	RCA TYPE No	Hallderson PART No.	Thordorson PART No
T1	117VAC	123VAC	6. 3VAC	5040			R-83DC			
	④ 1. 42A	⑤ . 75A	⑤ 1. 2A							
	SEC. 3	SEC. 4	SEC. 5							
	6. 3VAC	6. 3VAC								
	⑥ 1. 8A	⑥ 7. 5A								

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: HOFFMAN PART No	Stancor PART No	Merit PART No	Triad PART No	RCA TYPE No	Hallderson PART No
T2	Horiz. Output Trans.	5164	A-8137 & WC-5 ①	HVO-9②	D-19 ③	230T1②	FB4U ②
T3	Vert. Output Trans.	5157	A-8141	A-3039	A-104X	228T1	Z1806
T4A	Yoke-Horiz. (19MH)	9729	DY-11A	MDF-73	Y-22 ④	228D1	DF805
B	Yoke-Vert. (36MH)						
T5	Width Coil (2. 5-17MH)	5454	WC-8	WC-12 ⑤	WC-12 ⑤	212R1	

① Connect original terminal #2 to new terminal #7, original #8 to new #4, original #7 to new "T", original #4 to new #3, original #3 to new #1. Connect orange and black terminals of WC-5 across terminals #1 & #3, red and blue terms. to AGC and ground. If AGC fails to function properly, reverse one winding.
② Connect as in original circuit.
③ Connect terminal #8 to terminal #7, then connect original terminal #9 to new terminal #9, original #8 and #7 to new #8 and #7, original #5 to new #4, original #4 to new "T", original #3 to new #3, original #1 to new #1.
④ Use original deflection coil network.
⑤ Enlarge mounting holes.
⑥ Connect to coded blue and red terminals.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC.	REPLACEMENT DATA: HOFFMAN PART No	Stancor PART No.	Merit PART No	Triad PART No.	Hallderson PART No.	Thordorson PART No.	NOTES
T6	2. 2KΩ	3. 3Ω	5178	A-3876	A-2928	S-2X	Z1001	TS-24850	

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V C IMP.	REPLACEMENT DATA: HOFFMAN PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	5 1/4"	PM	3. 3Ω	9091	6T-803 Mod. P526-V	52A1	

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	SEC.	REPLACEMENT DATA: HOFFMAN PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	UHF Ant. Coil	0Ω						
L2	UHF Ant. Coil	0Ω						
L3	UHF Ant. Coil	0Ω						
L4	UHF Ant. Mixer & Osc. Coils	0Ω						
L5	RF Choke	0Ω						
L5A	Fil. Choke	0Ω						
B	Fil. Choke	0Ω						
L7	Cathode Choke	0Ω						
L8	UHF IF Input Coil	0Ω	. 3Ω					
L9	UHF IF Interstage Coil	. 3Ω	. 2Ω					
L10	UHF IF Interstage Coil	. 1Ω						
L11	VHF Ant. Coupling	0Ω						
L12	VHF Ant. Coupling	0Ω						
L13	VHF Ant. Coils	0DCT	0Ω					
L14	Fil. Choke	0Ω						
L15	Neutr. Coil	0Ω						
L16	VHF RF, Mixer Grid & Osc. Coils	0Ω						
L17	Conv. Plate	. 1Ω						
L18	1st Video IF	. 1Ω		5562		17-4525 ⋄	6219 ⋄	
L19	2nd Video IF	9Ω		5541		17-4504 †	6233 ⋄⋄	
L20	3rd Video IF	0Ω	.1Ω	5542		17-4503	6232 ⋄	Includes trap
L21	4th Video IF	. 3Ω		5543		17-4531 *	6234 ■	
L22	Series Peaking Coil	12Ω		5545	19-2100	TV-1M	4643	105 Microhenries

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	HOFFMAN PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L23	Shunt Peaking Coil	16Ω		5340	19-3300 †		4648 †	350 Microhenries; wound on 10 Meg resistor
L24	Series Peaking Coil	14Ω		5547	19-3100 ▲	TV-181 ▲	4642 ▲	105 Microhenries; wound on 8.2KΩ resistor
L25	Shunt Peaking Coil	16Ω		5548	19-3180	TV-184	6154	210 Microhenries
L26	4.5MC Trap	1.9Ω		5402	20-1004	TV-151	1470	
L27	Sound IF	.9Ω		5454	17-3400	TV-151	1470	
L28	Ratio Det.	8.5Ω	.5ΩCT	5443	17-1033	TV-110	1468	Tertiary winding= .25Ω
L29	Horiz. Osc.	46Ω		5447	19-1576	TV-163	6210	
L30	RF Choke	0Ω		5266	19-1003		4608	4 Microhenries

† Parallel with 10 Meg resistor.
▲ Parallel with 8.2KΩ resistor.
* Detune trap winding and disconnect R38.
■ Use adaptor plate.
♦ Use one winding only and use adaptor plate.
‡ Detune trap winding.
** Use one winding only; detune trap winding, and use adaptor plate.
§ Use winding with 56KΩ shunting resistor.
▲ Use one winding only.

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA					NOTES
		HOFFMAN PART No.	SELETRON PART No.	FEDERAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	
M1	.220A	9735	5QS1	1023A	6S350	350	
M2	.220A	9735	5QS1	1023A	6S350	350	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		HOFFMAN PART No.	SYLVANIA PART No.		
M3	1N82		1N82 or A		UHF Mixer- (clip-in)

MISCELLANEOUS

ITEM No.	PART NAME	HOFFMAN PART No.	NOTES
M4	Dial light	9505	# 44 bayonet
M5	Tuner	9795	UHF-VHF
M6	Tuner	9786	VHF only
M7	Trap		VHF antenna input filter
M8	Centering magnet	9722	
M9	I on trap	9702	

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST
DENVER, COLORADO

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly switch on volume control and T1.

If filaments light, check M1, M2, C1, C2A, C2B, C3 and other B+ filter and decoupling components.

SMALL AND/OR DIM PICTURE

Substitute V13. Check M1, M2, C1, C2, C3 and other associated components.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V17, V18, V19 and V20. Check waveform W15.

If Satisfactory	If Unsatisfactory
Check R94, T2, T4A and other associated circuit components.	Check C80, C77, R88, R90, R92 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V17, V18, V19 and V20. Measure B+.

If Satisfactory	If Unsatisfactory
Follow procedure outlined under "Loss of High Voltage".	Follow procedure outlined under "Small and/or Dim Picture".

BLOOMING

Check by substitution V17, V18, V19, V20 and V13. Check R94, T2, T4A and other associated circuit components.

GENERAL

RASTER SOUND NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER PICTURE NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER NO SOUND NO PICTURE

Check by substitution V2, V3, V4, V5, V6, V7 and V8. Check associated circuit components. In case of UHF check V1.

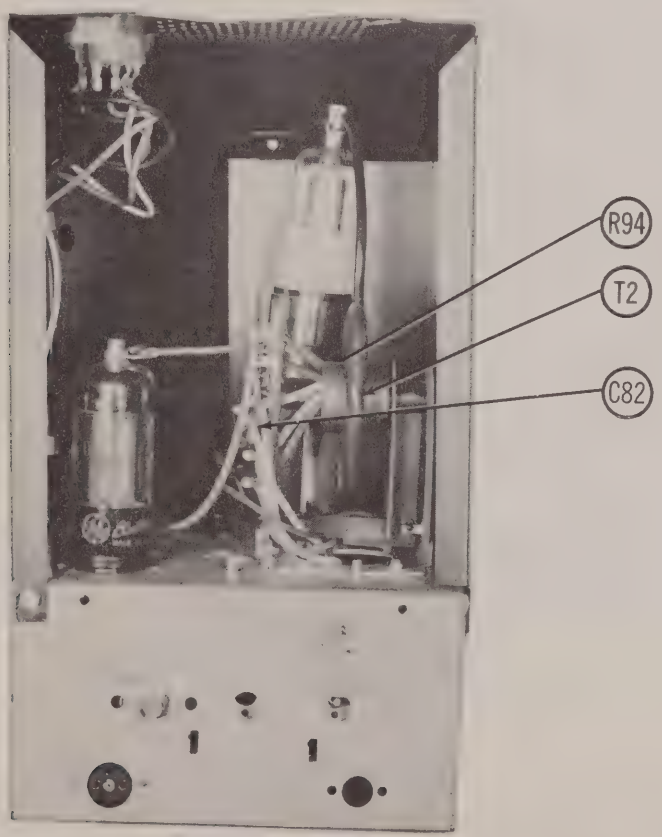
NO RASTER NO SOUND

Follow procedure outlined under "Dead Set".

INTERMITTENT STREAKS

Check video signal for interference pulses. Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



HIGH VOLTAGE COMPARTMENT

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the RF Tuner Oscillator Circuit may be accomplished by removal of the Channel Selector and Fine Tuning knobs. The adjustments are accessible, one at a time, through the small hole in the cabinet to the right of the Channel Selector shaft.

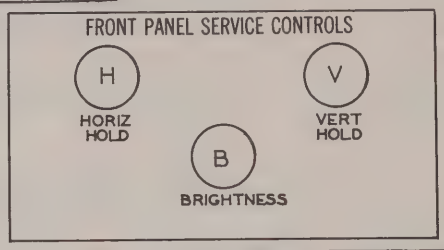
PICTURE TUBE SAFETY GLASS CLEANING

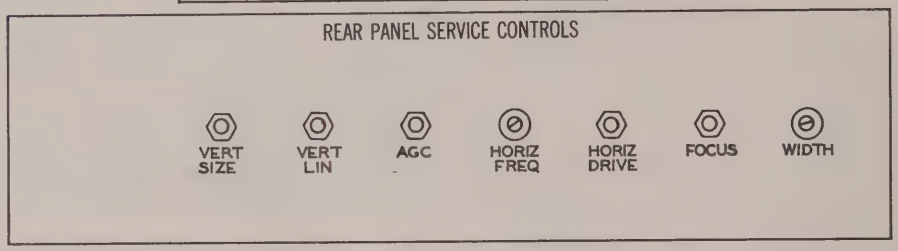
To clean safety glass remove two wood screws holding metal bracket at the front top of cabinet. Remove bracket. and metal strip. Remove safety glass by tilting forward up and out. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION





HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the Horiz. Oscillator Circuit can be made from the rear panel of the chassis. Set the Horiz. Hold Control at the Mid-position of its range and adjust the Horiz. Freq., slug (L29) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate Sound IF Detector Buzz, adjust the Ratio Detector Secondary (L28) located on top of chassis. (See tube placement chart).

FUSES

One fuseable resistor is used for L. V. Power Supply Protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

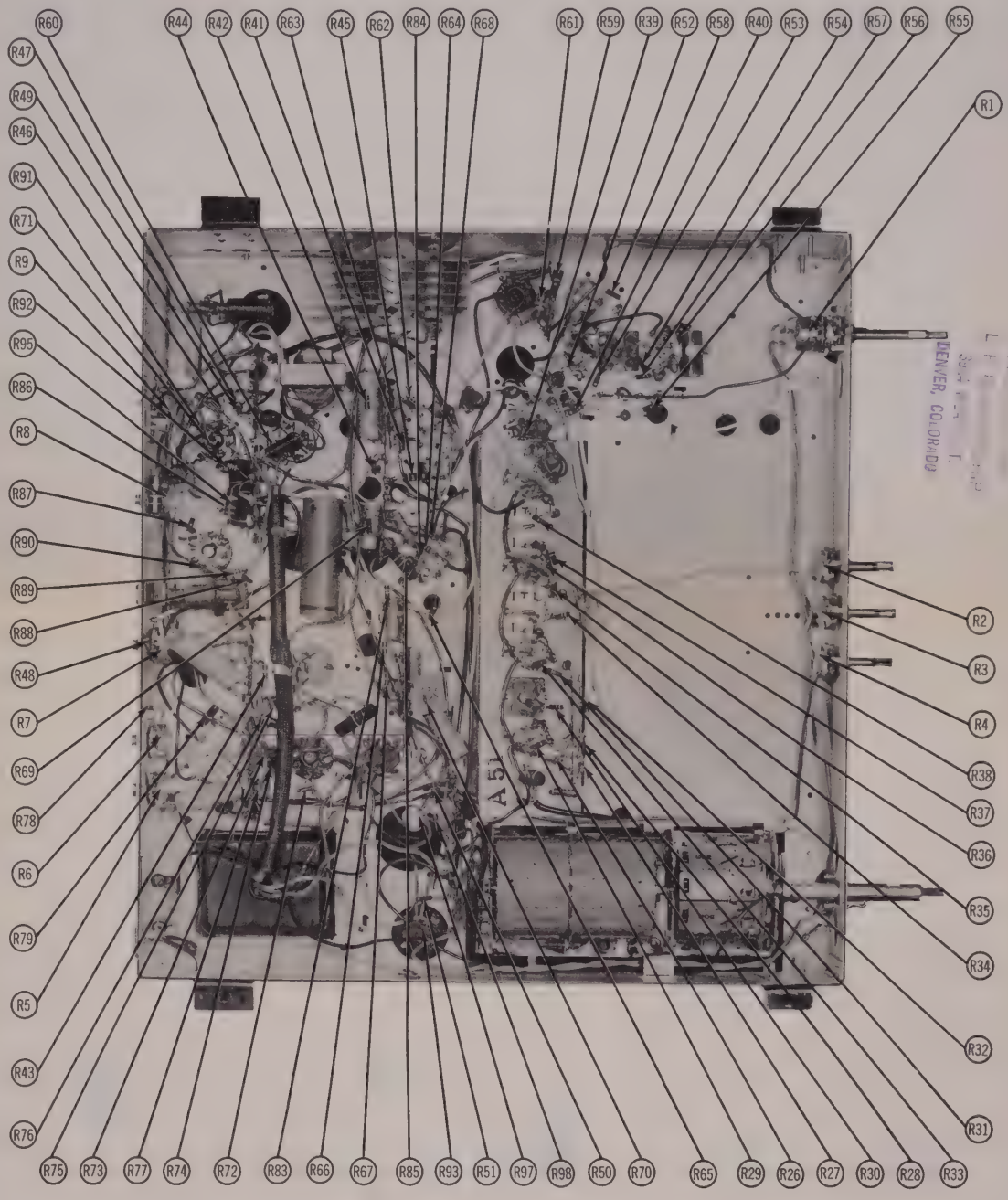
Remove 8 push on type control knobs from front panel.

Remove 7 wood and 1 metal screws. Remove rear cover.

Disconnect speaker leads, and built-in antenna.

Remove 4 chassis bolts and 2 wood screws. Remove chassis.

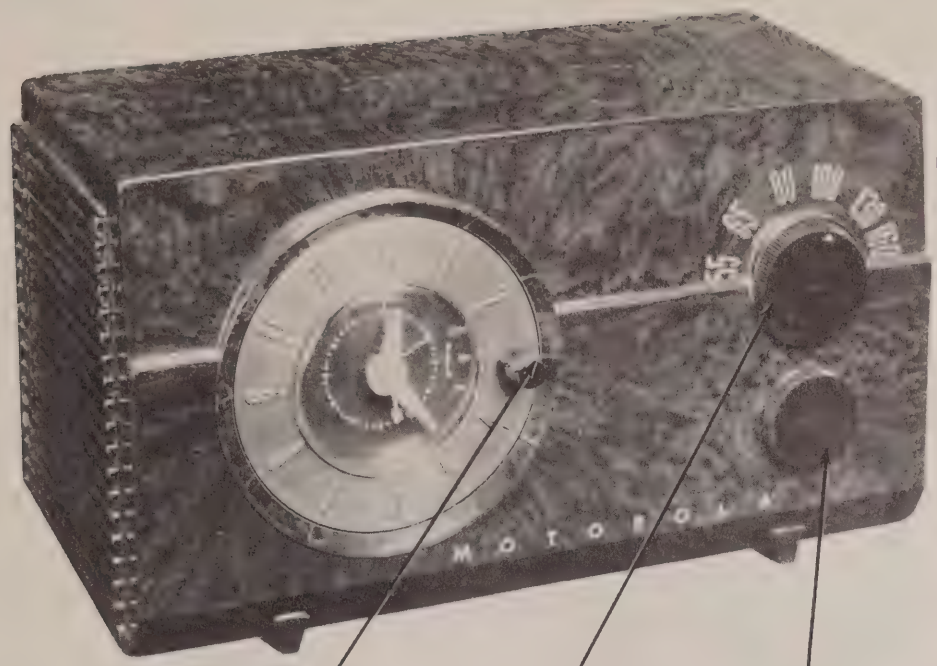
Remove 2 speaker nuts. Remove speaker.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

MOTOROLA MODELS
53C1, 53C2, 53C3, 53C4 (Ch. HS-366)

PROPERTY OF
L. F. BLANKENSHIP
3924 MENDEZ
DENVER, COLORADO



MOTOROLA MODELS
53C1, 53C2, 53C3, 53C4 (Ch. HS-366)

MOTOROLA MODEL 53C1

TRADE NAME	Motorola Models 53C1, 53C2, 53C3, 53C4 (Ch. HS-366)
MANUFACTURER	Motorola Inc., 4545 Augusta Blvd., Chicago 51, Ill.
TYPE SET	AC Operated AM Superheterodyne Receiver with Electric Clock
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AT6 Det.-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycle — RATING .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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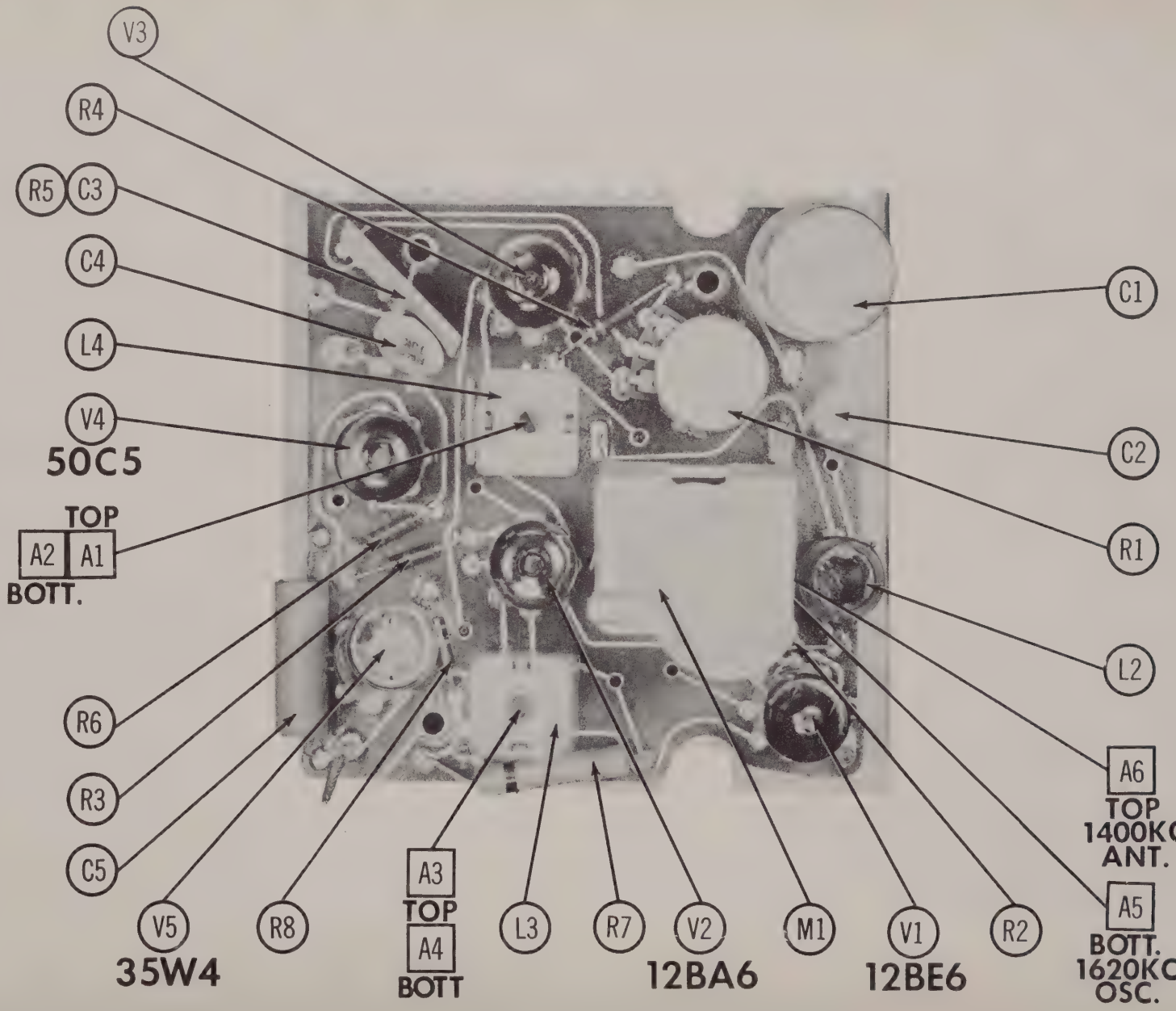

V3
R4
R5
C3
C4
L4
V4
50C5
TOP
A2
A1
BOTT.
R6
R3
C5
V5
35W4
R8
A3
TOP
A4
BOTT
L3
R7
V2
12BA6
M1
V1
12BE6
R2
A5
BOTT.
1620KC
OSC.
A6
TOP
1400KC
ANT.
L2
R1
C2
C1

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det-AF-Amplifier	12AT6	12AT6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	■50	150	23B630155	AFH2-15		BO15		FP213	TVL-2432	
B	▲30	150								
C2	.05	200	8A120842	P288-05	DF-503	CUB2S5		PT415	2TM-S5	
C3A	220									
B	5000									
C	5000		♦21B630180	♦PA-113-2	♦PC-151	♦116TM2	♦1408-02		♦103C5	
D	250									
E										
C4	10000		21R120853	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C5	.047	400	8K490232	489ZX-05		CUB4S47		PT4147	4TM-S47	

♦ Items C3A, C3B, C3C, C3D, C3E, R5A, R5B, R5C are combined in one unit.
When replacing items separately C3D and C3E should total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1 Meg	½	18A630279	Q13-137	AG-63-Z	BSK-70	U-53	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	NOTES
R2	22KΩ		6K119405	BTS-22K	
R3	100Ω		6K119402	BTS-100	
R4	3.3Meg		6K119407	BTS-3.3Meg	
R5A	6.8Meg			BTS-6.8Meg	
B	470KΩ		♦ 21B630180	BTS-470K	
C	470KΩ			BTS-470K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	NOTES
R6	150Ω	½	6K119403	BTS-150	
R7	1000Ω	2	6K121276	BTB-1000	
R8	27Ω	½	6K119401	BTS-27	

♦ Items R5A, R5B, R5C, C3A, C3B, C3C, C3D, C3E are combined in one unit.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: MOTOROLA PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	2.3KΩ	3Ω	25B630280	A-3332 ①	A-3025 ①		Z1101 ①		① Bend mounting tabs down. File out slots. Mount on original mounting bracket.

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: MOTOROLA PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3Ω	50C631498 50C630287 ② 50C631455 ②	ST-113	4A07	① Drill one new mounting hole. ② Alternate speaker

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Loop Ant.	3.2Ω		1V630377				See Note 1.
L2	Osc. Coil	.9Ω	10Ω	24B630327	14-1073		69-Osc. †	
L3	Input IF	15Ω	15Ω	24C630284	16-6758	BC-352	12-C1	
L4	Output IF	15Ω	15Ω	24K630898	16-6758	BC-353	12-C2	

Note 1. Includes cabinet back, AC receptacle and power cord.
† Use connecting wires as mounting support.

MISCELLANEOUS

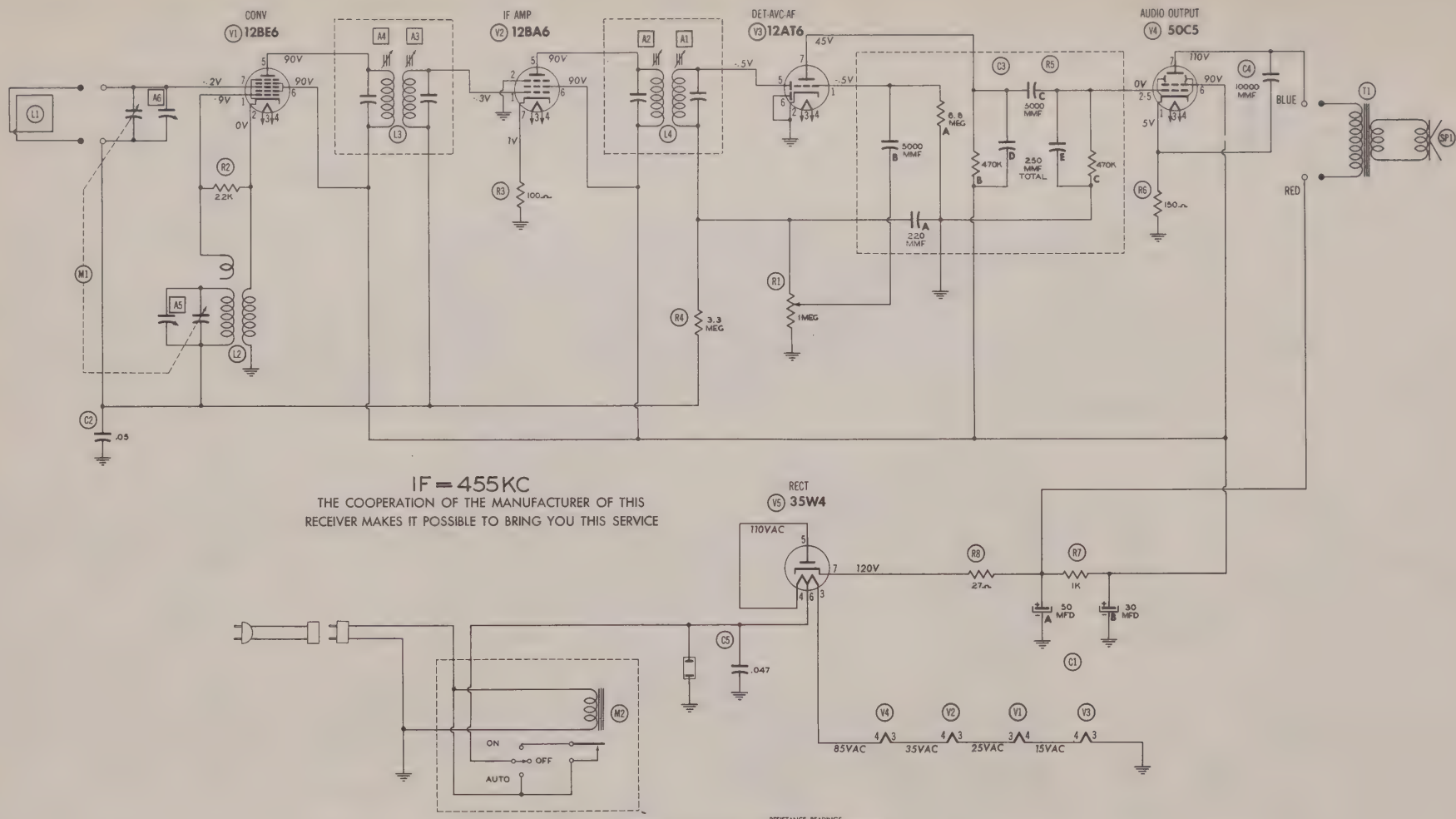
ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M1	Tuning cap	19K630263	2 Section (28-387MMF, 15-120MMF)
M2	Clock		
	Cabinet	16E621760	Walnut (53C1)
	Cabinet	16K621761	Ivory (53C2)
	Cabinet	16K621762	Green (53C3)
	Cabinet	16K621763	Red (53C4)
	Knob	36B630870	Operation selector (clock) black
	Knob	36B622111	Tuning (black)
	Knob	36B622107	Volume (black)

SET 236 FOLDER 7

MOTOROLA MODEL 53C1 (Ch. HS-366)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

MOTOROLA MODEL 53C1 (Ch. HS-366)



IF = 455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	0Ω	25Ω	14Ω	†1KΩ	†1KΩ	4.3Meg
V 2	12BA6	4.3Meg	0Ω	25Ω	38Ω	†1KΩ	†1KΩ	100Ω
V 3	12AT6	6.8Meg	0Ω	0Ω	14Ω	2Meg	0Ω	†47KΩ
V 4	50C5	150Ω	470KΩ	38Ω	87Ω	470KΩ	†1KΩ	†200Ω
V 5	35W4	INF	INF	87Ω	130Ω	130Ω	110Ω	40KΩ

† MEASURED FROM PIN 7 OF V5

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PROPERTY OF
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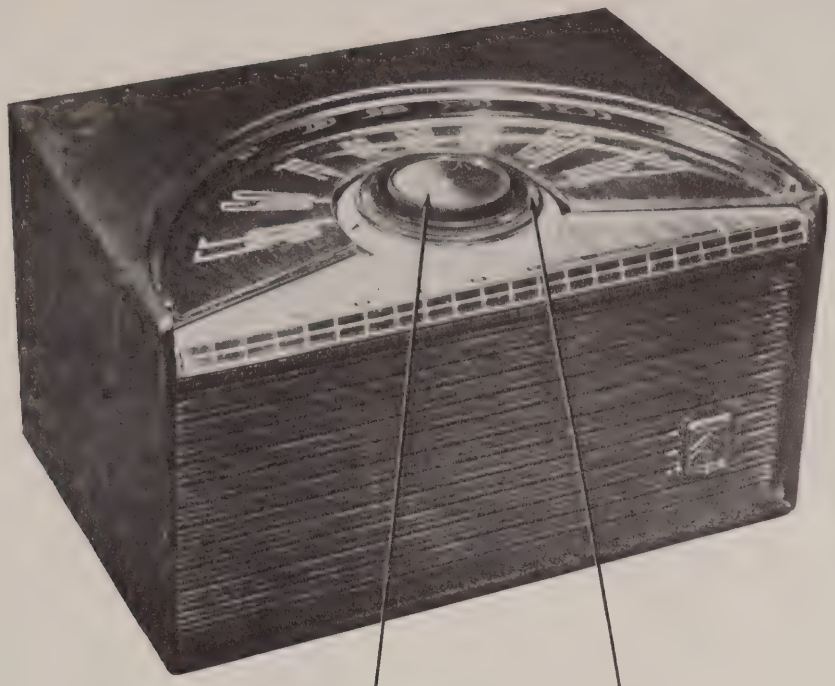
DENVER, COLORADO

MOTOROLA MODELS
53X1, 53X2, 53X3, 53X4 (Ch. HS-336)



MOTOROLA MODELS
53X1, 53X2, 53X3, 53X4 (Ch. HS-336)

MOTOROLA MODEL 53X1

TRADE NAME	Motorola Models 53X1, 53X2, 53X3, 53X4 (Ch. HS-336)
MANUFACTURER	Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AT6 Det.-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC RATING .22 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400%Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

MOTOROLA
MODEL 53X1 (Ch. HS-336)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		MOTOROLA PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det-AVC-AF Amp.	12AT6	12AT6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	50	150	23K621898	PRS150/50-30		BBRD-5315		TCD-497	TVA-2450	Red
B	30	150								Green
C2	.05	200	8R9821	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C3	5000		21R115312	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C4A	2000				DD-202	K072	801-002	DC-522		
B	220		21B482847	PA-100	D6-221	TP39	GP1K-221	5GA-T22	34C3	Note 1
C	220				D6-221	TP39	GP1K-221	5GA-T22		
D	5000				DD-502	K080	801-005	DC-525		
C5	10000		21R482726	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C6	.047	400	8K490232	489ZX-047		PJ4S47		PT4147	4TM-S47	

Note 1. Items C4A, C4B, C4C and C4D are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1 Meg	½	18B621769				UT-438	Volume tapped at 300K -Note
B	Switch						US-26	Attach to R1A

Note . Some models may use alternate control Part No. 18B521769.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R2	22KΩ	½	6R6028	BTS-22K	
R3	150Ω	½	6R3992	BTS-150	
R4	2.2Meg	½	6R3927	BTS-2.2Meg	
R5	33KΩ	½	6R6012	BTS-33K	
R6	10 Meg	½	6R2109	BTS-10Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R7	470KΩ	½	6R6032	BTS-470K	
R8	470KΩ	½	6R6032	BTS-470K	
R9	150Ω	½	6R3992	BTS-150	
R10	1000Ω	1	6R3953	BTA-1000	
R11	27Ω	½	6R5683	BTS-27	

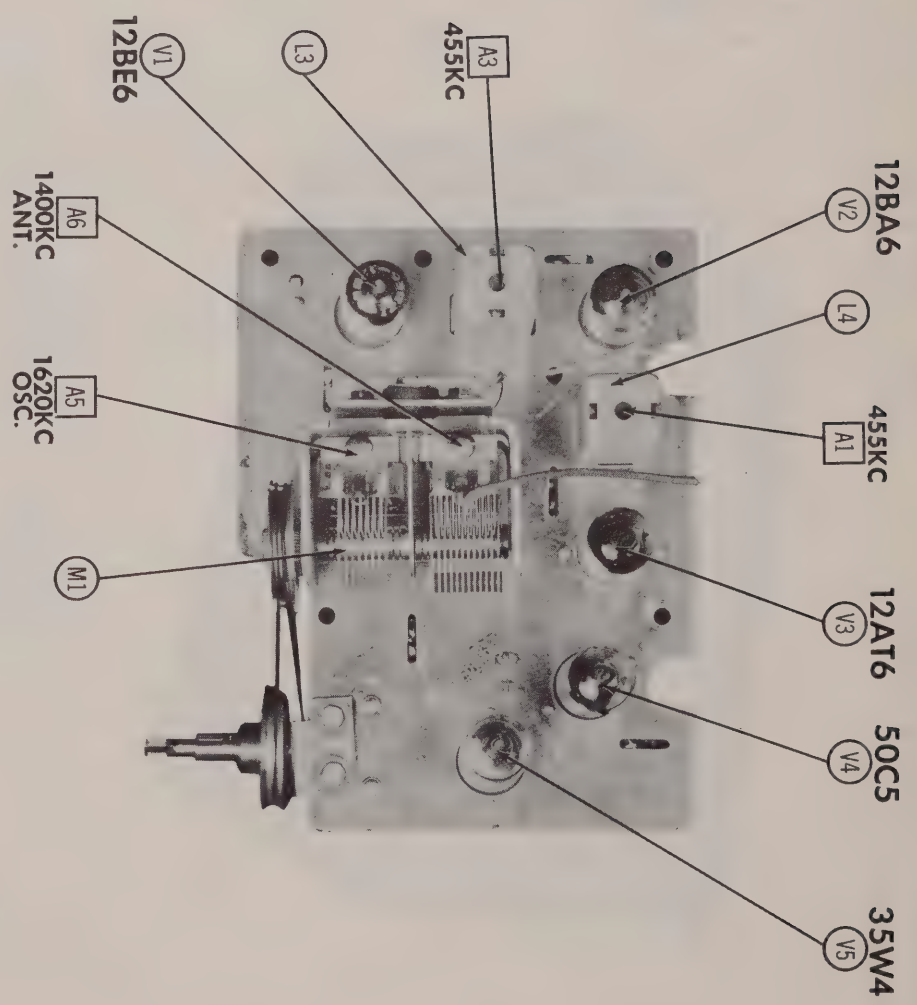
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	2.4KΩ	3.7Ω	25K621779-R						

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	JENSEN PART No.	QUAM PART No.	
SP1	5"X7"	PM	3.7Ω	50C621783			

CHASSIS—TOP VIEW



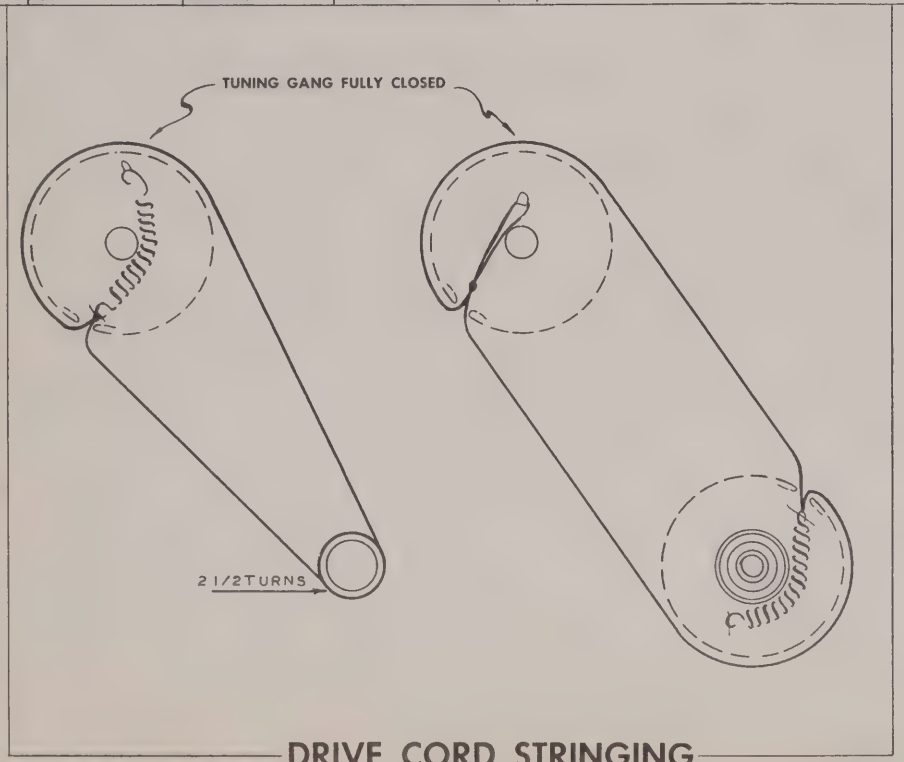
PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3.4Ω		1V630051				Includes cabinet back with Power Cord Tapped @ 1Ω
L2	Osc. Coil	1Ω		24K621753				
L3	Input IF	17Ω	17Ω	24C485553	16-6758	BC-352	12-C1	
L4	Output IF	17Ω	17Ω	24C485553	16-6758	BC-353	12-C2	

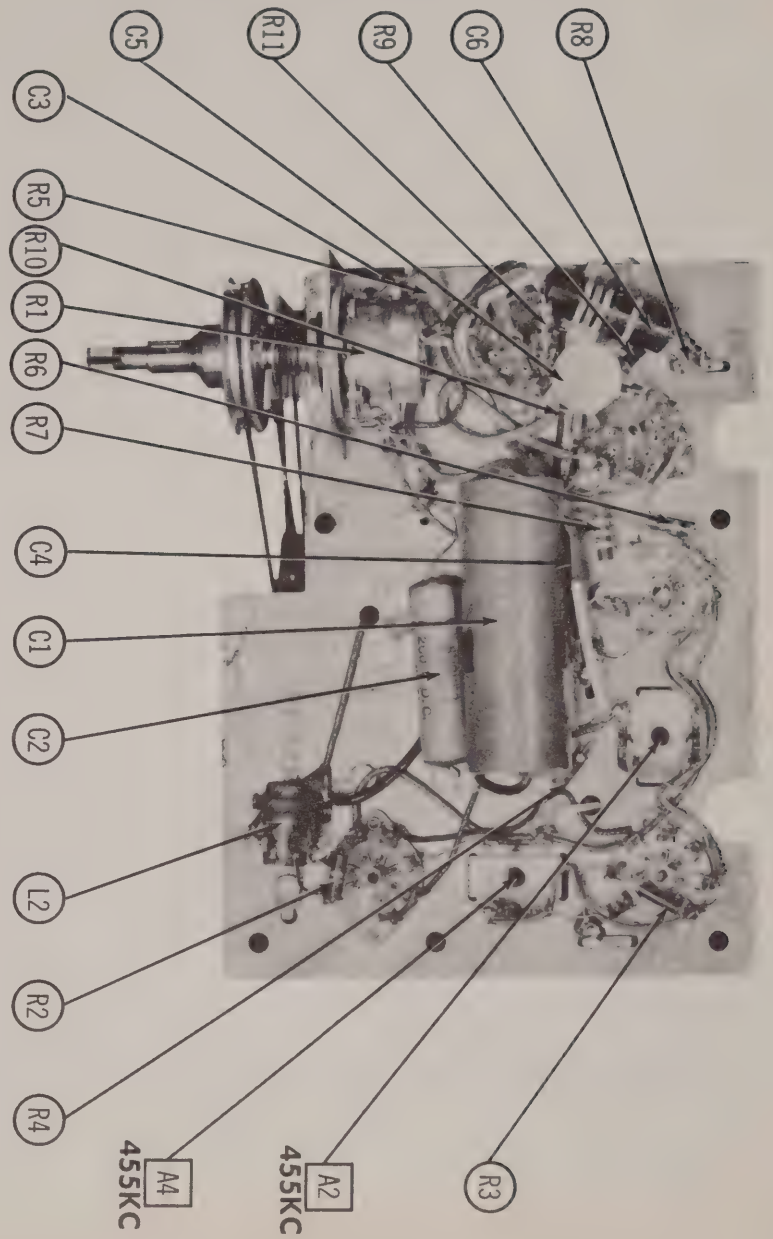
MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M1	Tuning Cap	19B621775	2 section (28-395MMF, 17-110MMF)
	Cabinet	16E630040	Walnut (53X1)
	Cabinet	16K630041	Sand (53X2)
	Cabinet	16K630042	Green (53X3)
	Cabinet	16K630043	Rust (53X4)
	Knob	52B622086	Dial pointer
	Knob	36B622075	Tuning-walnue (53X1)
	Knob	36K622077	Tuning-sand (53X2)
	Knob	36K622078	Tuning-green (53X3)
	Knob	36K622079	Tuning-terra cotta (53X4)
	Knob	36B622076	Volume-walnut (53X1)
	Knob	36K622080	Volume-sand (53X2)
	Knob	36K622081	Volume-green (53X3)
	Knob	36K622082	Volume-terra cotta (53X4)



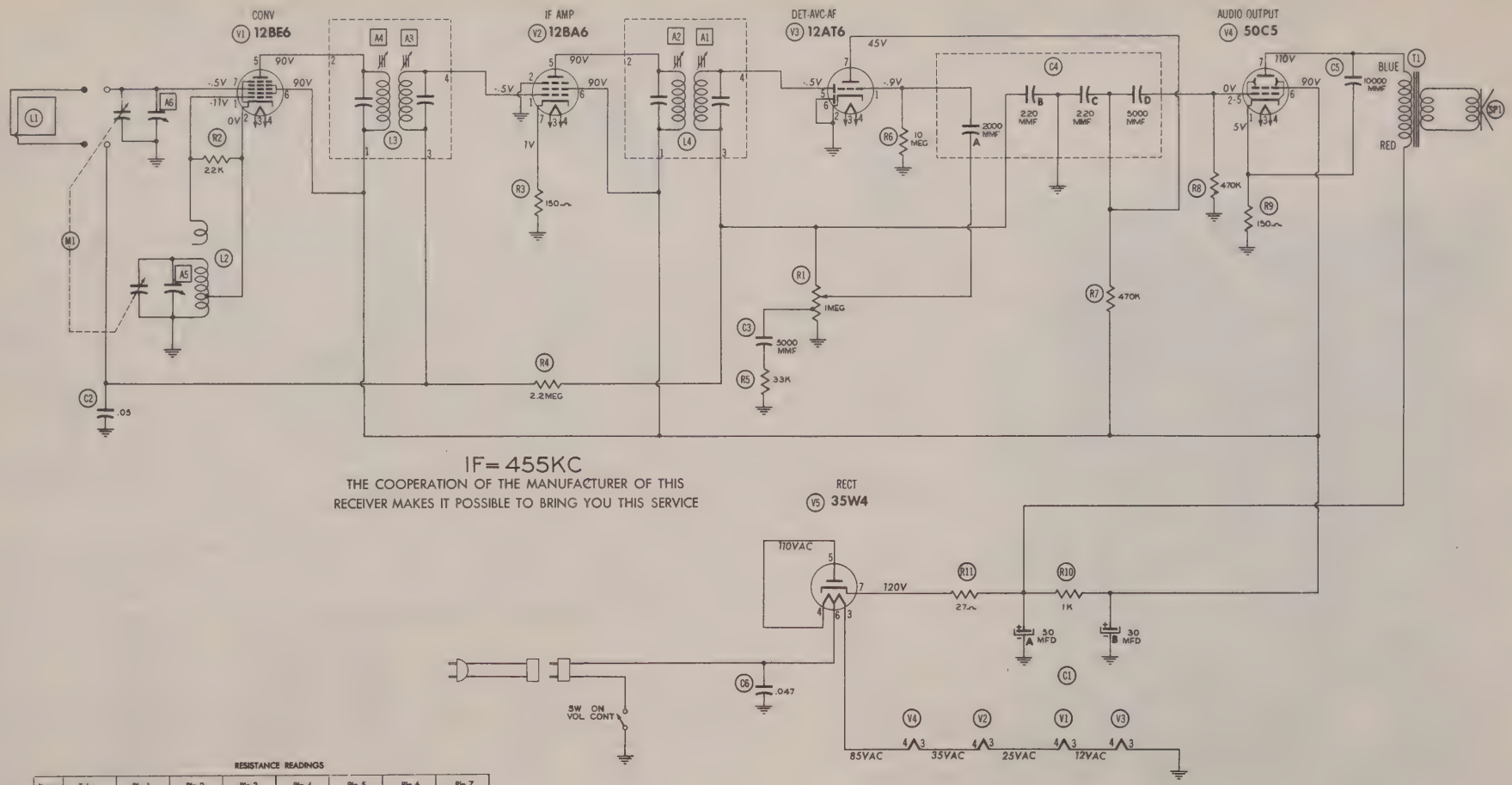
DRIVE CORD STRINGING

CHASSIS—BOTTOM VIEW



MOTOROLA
MODEL 53X1 (Ch. HS-336)

MOTOROLA
MODEL 53X1 (Ch. HS-336)



IF= 455KC

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RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	0Ω	14Ω	25Ω	†1KΩ	†1KΩ	3.2Meg
V 2	12BA6	3.2Meg	0Ω	25Ω	36Ω	†1KΩ	†1KΩ	150Ω
V 3	12AT6	10Meg	0Ω	0Ω	14Ω	1Meg	0Ω	†471KΩ
V 4	50C5	150Ω	470KΩ	36Ω	85Ω	470KΩ	†1KΩ	†207Ω
V 5	35W4	†27Ω	†27Ω	85Ω	110Ω	110Ω	120Ω	100KΩ

† MEASURED FROM PIN 7 OF V5

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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MUNTZ MODELS 317T1, 321C1, 321D1, 321T3, 321T4, 321T5 (Ch. 37A4, 37B4, 37C4)

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MODEL 321T3

MUNTZ MODELS 317T1, 321C1, 321D1, 321T3, 321T4, 321T5 (Ch. 37A4, 37B4, 37C4)

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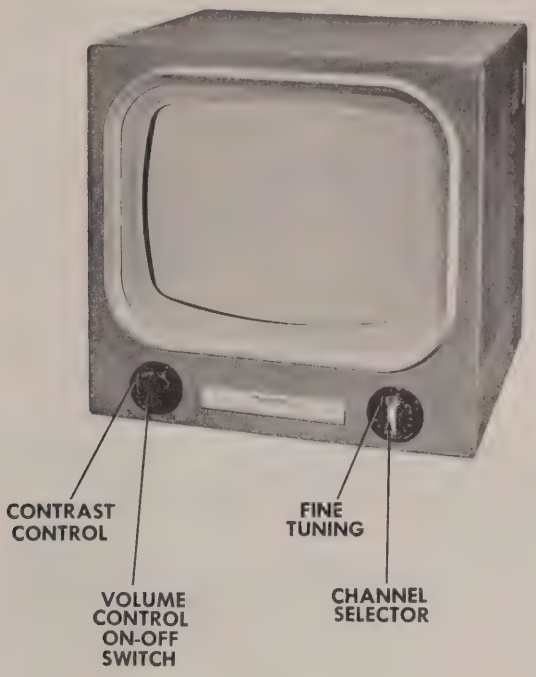

MUNTZ MODEL 321T3

TRADE NAME	Muntz	MODELS	CHASSIS
		317T1	37C4
		321C1, 321D1, 321T4	37A4
		321T3, 321T5	34B4
MANUFACTURER	Muntz TV Inc., 1000 Grey Ave., Evanston, Ill.		
TYPE SET	Television Receiver		
TUBES	Seventeen		
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING 1.52 Amp. @ 117 Volts AC	
TUNING RANGE	Channel 2 thru 13, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

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MUNTZ MODELS 317T1, 321C1, 321D1, 321T3, 321T4, 321T5 (Ch. 37A4, 37B4, 37C4)

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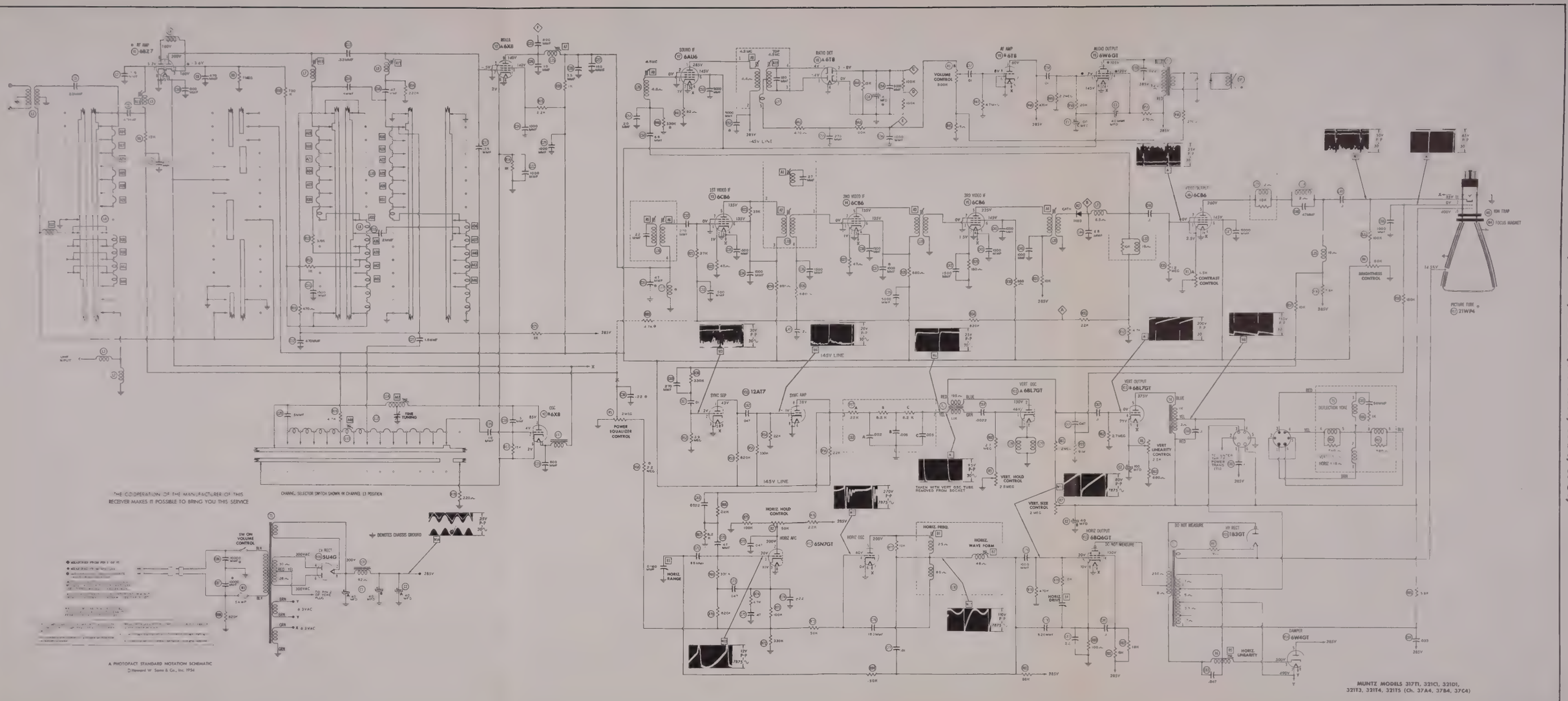
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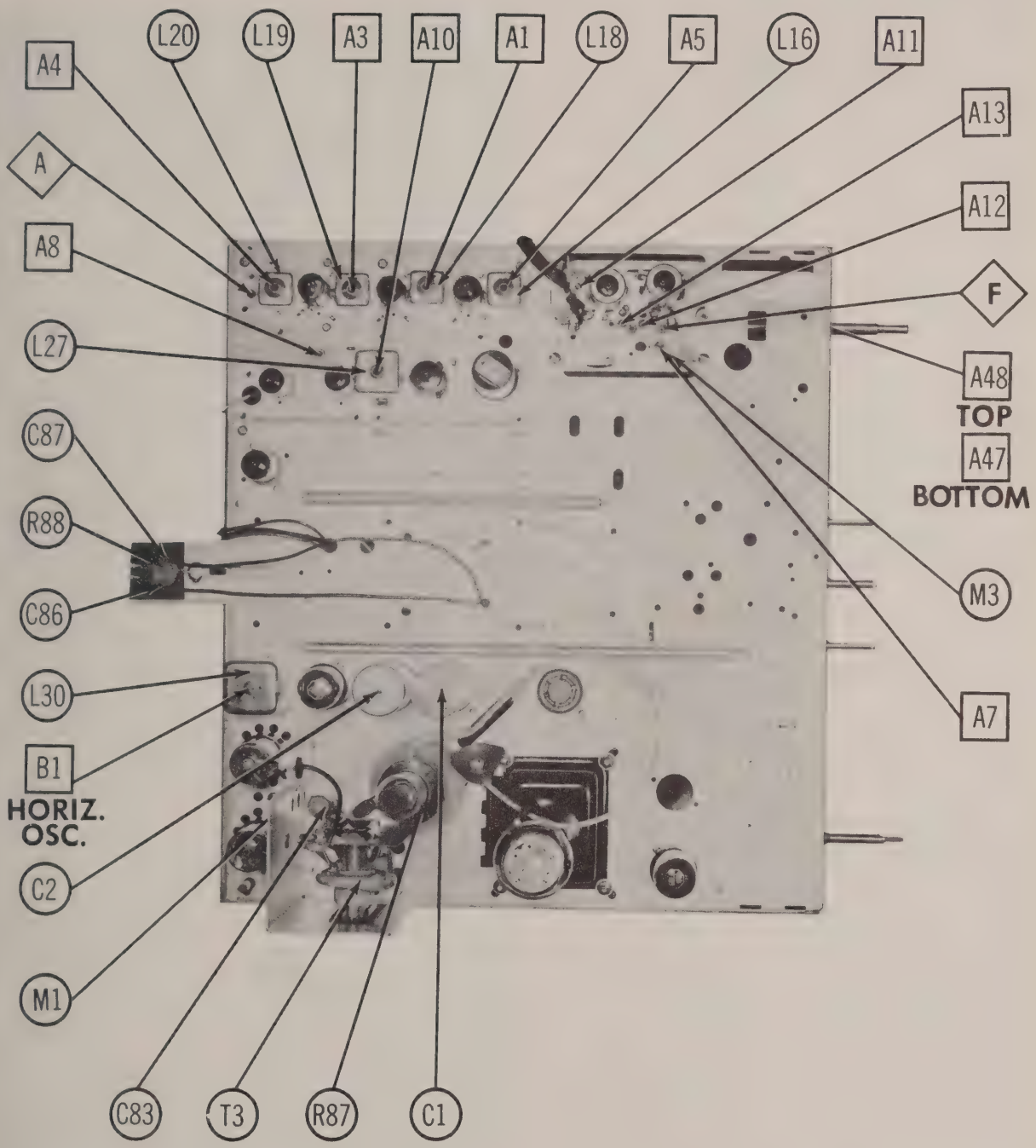

CHASSIS TOP VIEW

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CHASSIS-BOTTOM VIEW-CAPACITOR IDENTIFICATION

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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the horizontal oscillator tube (V12).

VIDEO IF ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The marker and sweep generator outputs should be attenuated if the output voltage alters the shape of the response curve.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.01MFD	High side to pin 1 (grid) of 6CB6 (V3). Low side to chassis.	44MC (10MC Swp)	41.25MC 43.0MC 45.0MC	12	Vert. Amp. to point (A). Low side to chassis.	A1, A2, A3, A4	Adjust for response curve similar to Fig.1. Adjust A1 for MINIMUM marker amplitude at 41.25MC. A2 affects 43MC marker position, A3 affects 45MC marker position, Adjust A4 for proper tilt.
2.	Direct	High side to an ungrounded tube shield floating over converter tube. Low side to chassis.	44MC (10MC Swp)	41.25MC 43.0MC 45.0MC 45.75MC 47.25MC	"	"	A5, A6, A7	Adjust for response curve similar to Fig.2. Adjust A5 for MINIMUM marker amplitude at 47.25MC. Simultaneously adjust A6 and A7 (on tuner) to place 45.75MC marker at 50%.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (± 1%) resistors in series from point (C) to chassis. The junction of these two resistors is alignment point (D) as shown on the schematic.
Remove 6CB6 (V5) from socket.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
3.	.1MFD	High side thru .1MFD to point B . Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (C). Common to chassis.	A8, A9	Adjust for maximum deflection.
4.	"	"	"	"	DC probe to point (E). Common to point (D).	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Replace V5 in its socket.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.
Remove 6CB6 (V5) from its socket.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	.1MFD	High side thru .1MFD to point B . Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point (C). Low side to chassis.	A8, A9	Disconnect stabilizing capacitor C4. Adjust for curve of maximum amplitude and symmetry similar to Fig. 3.
4.	"	"	"	"	"	Vert. Amp. to point (E). Low side to chassis.	A10	Reconnect stabilizing capacitor C4. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 4. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines.

TUNER IDENTIFICATION

Note the code letter following the run number stamped on the rear of the chassis.
Code letter "T" indicates tuner PR-0212 is used.
Code letter "G" indicates tuner PR-0206 is used.
Code letter "S" indicates tuner PR-0207 is used.
These tuners should not be interchanged.

PR-0212 TUNER RF ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Remove 6CB6 (V3) from its socket.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (20MC Swp)	211.25MC 215.75MC	13	Vert. Amp. to point (F). Low side to tuner chassis.	A11, A12 A13	Adjust for response curve similar to Fig.5.
6.	"	"	207MC (20MC Swp)	205.25MC 209.75MC	12	"	A14, A15 A16	Adjust by compressing or expanding incremental loops in order given. Adjust for response curve similar to Fig. 5.
7.	"	"	201MC (20MC Swp)	199.25MC 203.75MC	11	"	A17, A18, A19	"
8.	"	"	195MC (20MC Swp)	193.25MC 197.75MC	10	"	A20, A21, A22	"
9.	"	"	189MC (20MC Swp)	187.25MC 191.75MC	9	"	A23, A24 A25	"
10.	"	"	183MC (20MC Swp)	181.25MC 185.75MC	8	"	A26, A27 A28	"
11.	"	"	177MC (20MC Swp)	175.25MC 179.75MC	7	"	A29, A30 A31	"
12.	"	"	85MC (20MC Swp)	83.25MC 87.75MC	6	"	A32, A33 A34	"
13.	"	"	79MC (20MC Swp)	77.25MC 81.75MC	5	"	A35, A36 A37	"
14.	"	"	69MC (20MC Swp)	67.25MC 71.75MC	4	"	A38, A39 A40	"
15.	"	"	63MC (20MC Swp)	61.25MC 65.75MC	3	"	A41, A43 A43	"
16.	"	"	57MC (20MC Swp)	55.25MC 59.75MC	2	"	A44, A45 A46	Adjust by compress or expanding incremental loops in order given. Adjust for response curve similar to Fig. 5. Replace V3 in its socket.

ALIGNMENT INSTRUCTIONS (cont)

PR-0212 TUNER OSCILLATOR ALIGNMENT

Tune in a TV station on the highest channel available between channels 7 and 13 and adjust A47 for clearest picture with best sound. Tune in a TV station on the highest channel available between channels 2 and 6 and adjust A48 for clearest picture with best sound.

PR-0206 TUNER RF ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Remove 6CB6 (V3) from its socket.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
17.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (20MC Swp)	193.25MC 197.75MC	10	Vert. Amp. to point ◇G◇. Low side to chassis.	A49, A50 A51	Adjust for curve of maximum amplitude and symmetry similar to Fig. 5.
18.	"	"	213MC (20MC Swp)	211.25MC 215.75MC	13	"		Check for response similar to Fig. 5. If markers fall below 70% on any channel make compromise adjustments of A49, A50 and A51 with channel switch set to that channel, then recheck on all other channels to see that they have not been seriously affected. Replace V3 in its socket.
			207MC (20MC Swp)	205.25MC 209.75MC	12			
			201MC (20MC Swp)	199.25MC 203.75MC	11			
			189MC (20MC Swp)	187.25MC 191.75MC	9			
			183MC (20MC Swp)	181.25MC 185.75MC	8			
			177MC (20MC Swp)	175.25MC 179.75MC	7			
			85MC (20MC Swp)	83.25MC 87.75MC	6			
			79MC (20MC Swp)	77.25MC 81.75MC	5			
			69MC (20MC Swp)	67.25MC 71.75MC	4			
			63MC (20MC Swp)	61.25MC 65.75MC	3			
			57MC Swp (20MC Swp)	55.25MC 59.75MC	2			

PR-0206 TUNER OSCILLATOR ALIGNMENT

Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of channels, it may be possible to correct them in one step using A52. It should be noted that this is an all channel oscillator circuit adjustment and should not be used to correct any individual channel. If adjustment of A52 will not bring all channels well within the range of the fine tuning control, it will be necessary to adjust the channel strip adjustment for each channel that is off frequency. The channel oscillator adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
19.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. to point ◇A◇. Low side to chassis.	A53	Adjust to place sound marker in trap notch as in Fig. 6. Video marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A54	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A55	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A56	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A57	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A58	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A59	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A60	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A61	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A62	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A63	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A64	

PR-0207 TUNER RF ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Remove 6CB6 (V3) from its socket.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
20.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (20MC Swp)	193.25MC 197.75MC	10	Vert. Amp. to point ◇H◇. Low side to chassis.	A65,A66 A67	Adjust for curve of maximum amplitude and symmetry similar to Fig. 5.
21.	"	"	213MC (20MC Swp)	211.25MC 215.75MC	13			Check for response similar to Fig. 5. If markers fall below 70% on any channel make compromise adjustments of A65, A66 and A67 with channel switch set to that channel, then recheck on all other channels to see that they have not been seriously affected. Replace V3 in its socket.
			207MC (20MC Swp)	205.25MC 209.75MC	12			
			201MC (20MC Swp)	199.25MC 203.75MC	11			
			189MC (20MC Swp)	187.25MC 191.75MC	9			
			183MC (20MC Swp)	181.25MC 185.75MC	8			
			177MC (20MC Swp)	175.25MC 179.75MC	7			
			85MC (20MC Swp)	83.25MC 87.75MC	6			
			79MC (20MC Swp)	77.25MC 81.75MC	5			
			69MC (20MC Swp)	67.25MC 71.75MC	4			
			63MC (20MC Swp)	61.25MC 65.75MC	3			
			57MC (20MC Swp)	55.25MC 59.75MC	2			

ALIGNMENT INSTRUCTIONS (cont)

PR-0207 TUNER OSCILLATOR ALIGNMENT

The channel oscillator adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
22.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. to point (A). Low side to chassis.	A68	Adjust to place sound marker in trap notch as in Fig. 6. Video marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A69	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A70	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A71	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A72	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A73	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A74	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A75	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A76	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A77	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A78	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A79	

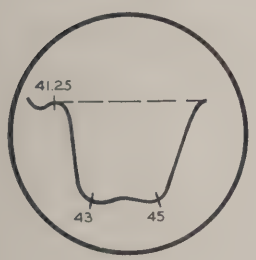


FIG. 1

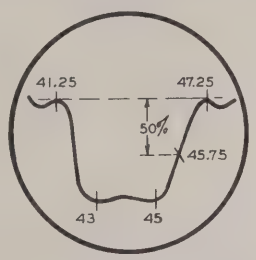


FIG. 2

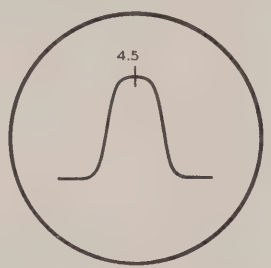


FIG. 3

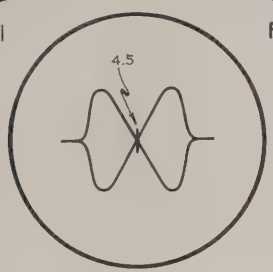


FIG. 4

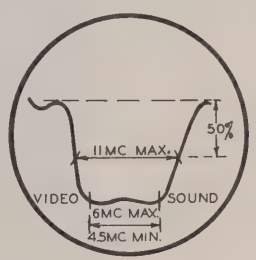


FIG. 5

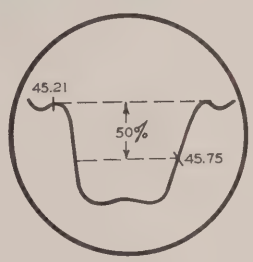
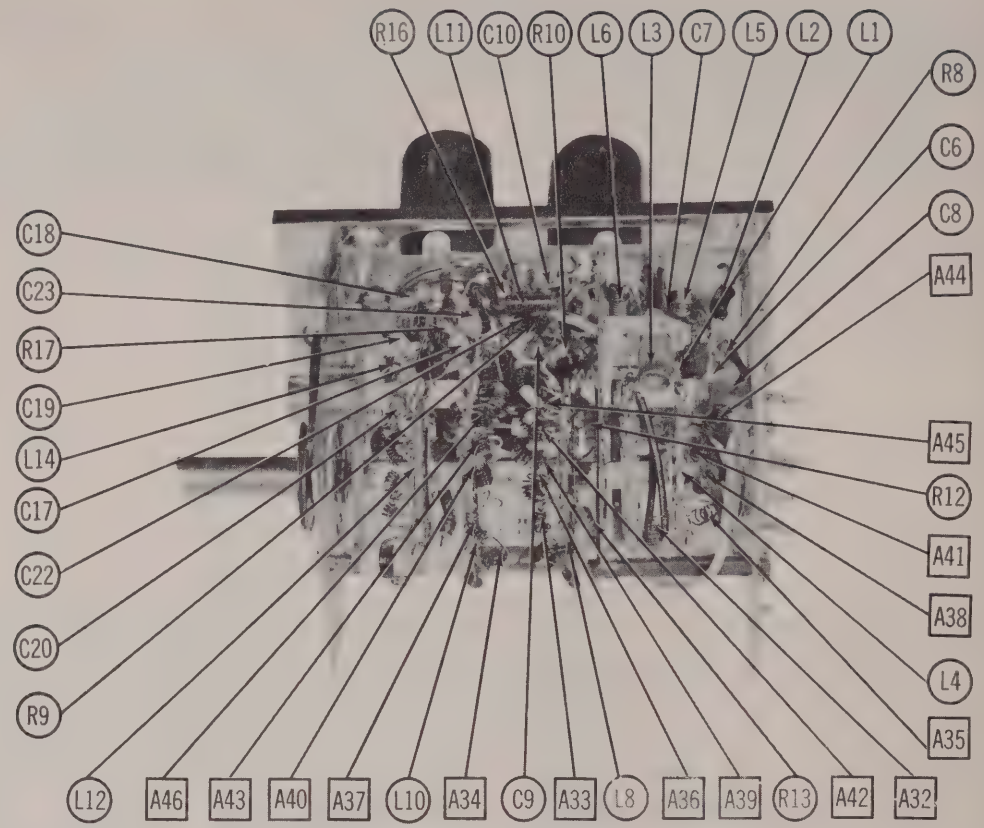
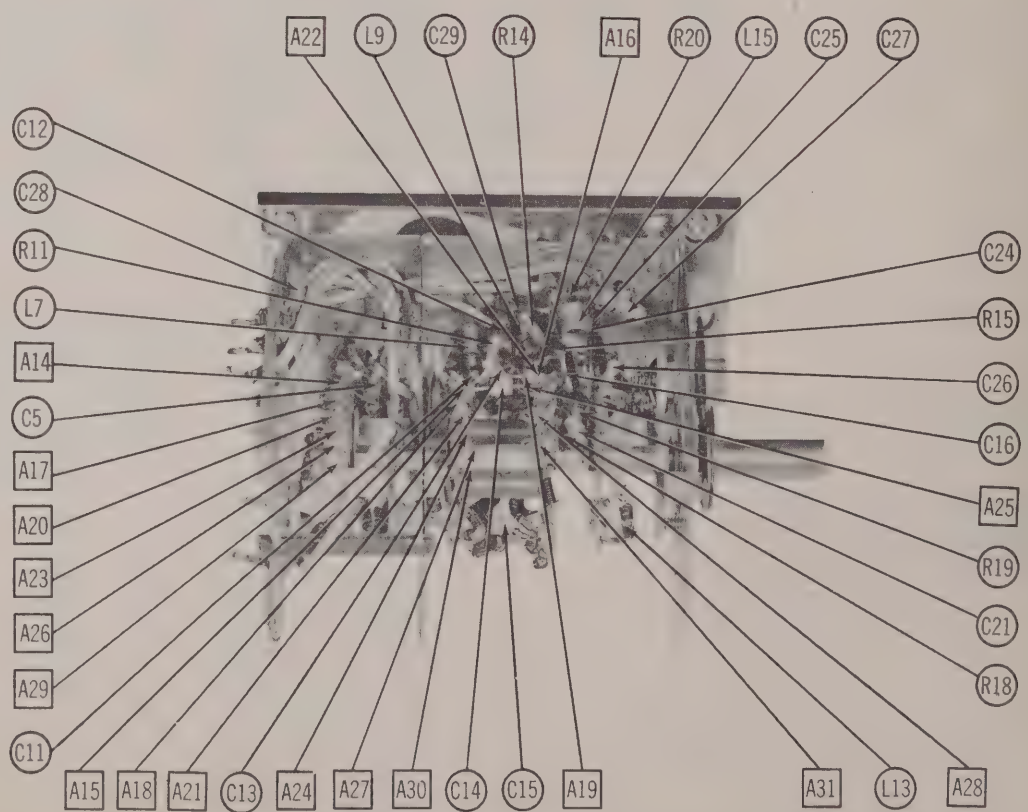


FIG. 6

MUNTZ MODELS 317T1, 321C1, 321D1, 321T3, 321T4, 321T5 (Ch. 37A4, 37B4, 37C4)

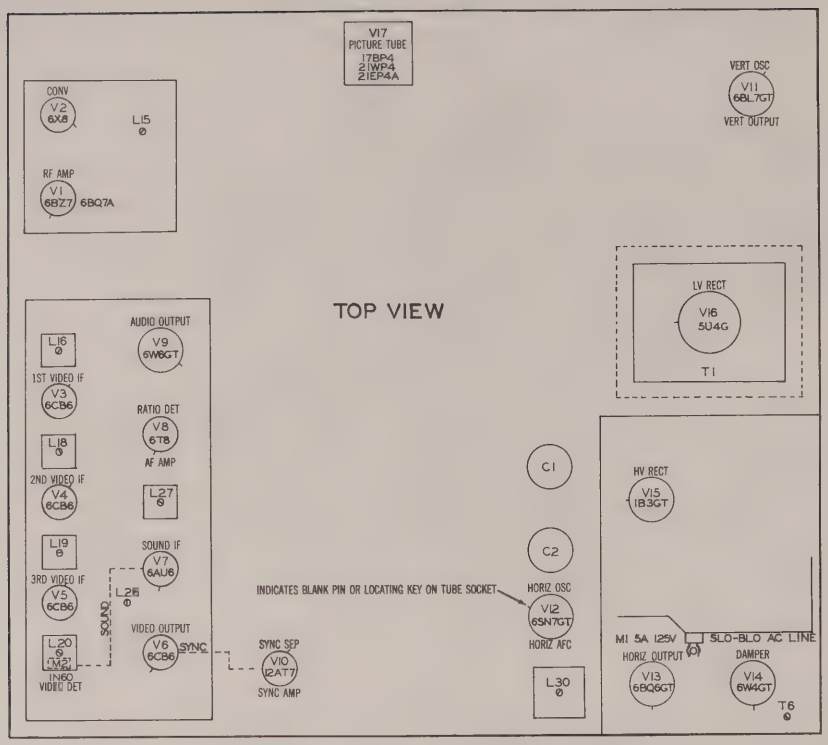


RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V16, Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V9
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V17
Has pic, no sound - V7, V8, V9

SYNC FAILURE
No vert. sync - V10, V11
No horiz. sync - V10, V12
No vert. or horiz. sync - V10

SWEEP FAILURE
No raster, has sound - V12, V13, V14, V15, V17
No vertical deflection - V11
Poor vert. linearity or foldover - V11
Poor horiz. linearity or foldover - V12, V13, V14
Narrow picture - V12, V13, V14, V15, V16
Vert. off freq. - V10, V11
Horiz. off freq. - V10, V12

RESISTANCE MEASUREMENTS

PRO... D...
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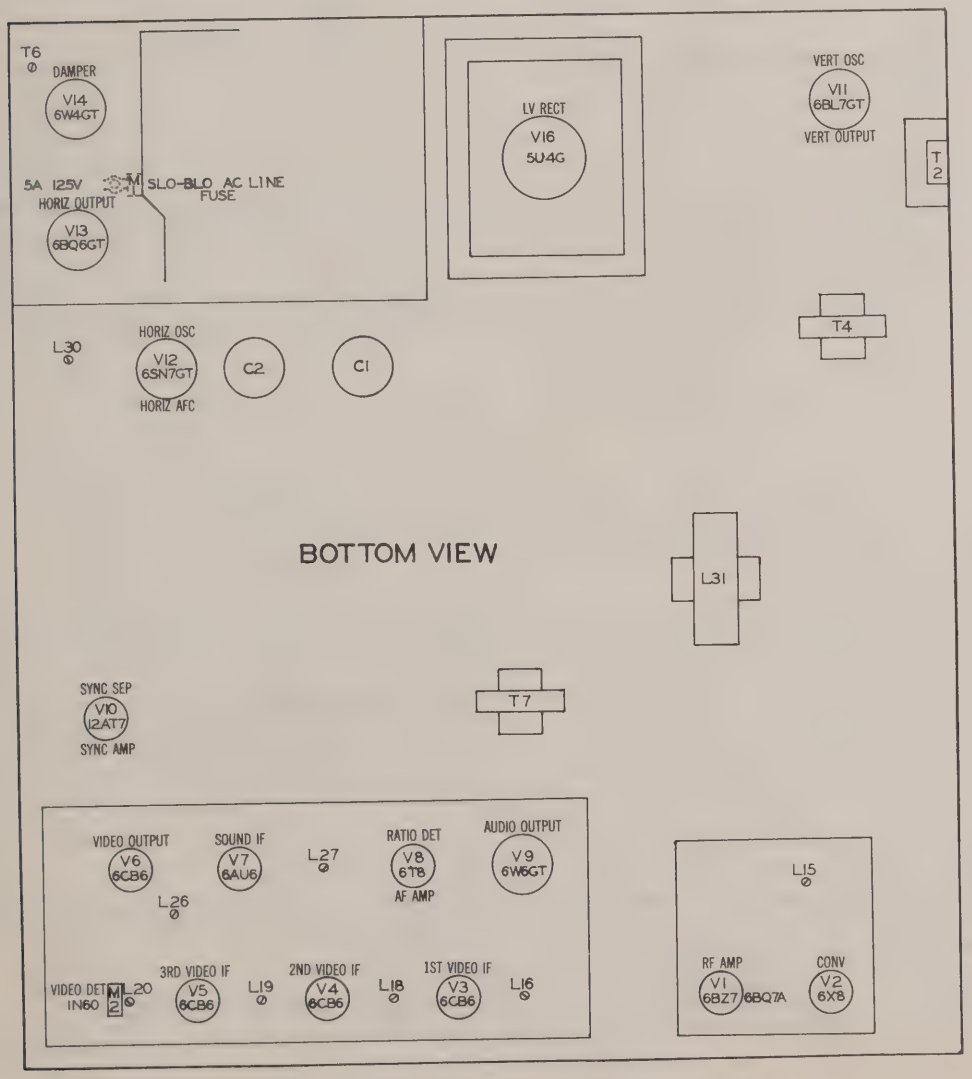
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BZ7	†1.6KΩ	†500KΩ	INF	.1Ω	0Ω	INF	680KΩ	0Ω	0Ω
V 2	6X8	0Ω	15KΩ	■4.7KΩ	0Ω	.1Ω	220Ω	220KΩ	■2.2KΩ	■1KΩ
V 3	6CB6	875KΩ	47Ω	0Ω	.1Ω	■680Ω	■680Ω	0Ω		
V 4	6CB6	850KΩ	47Ω	0Ω	.1Ω	■680Ω	■680Ω	0Ω		
V 5	6CB6	.1Ω	180Ω	.1Ω	0Ω	†10KΩ	■680Ω	0Ω		
V 6	6CB6	1.2Meg	320Ω	0Ω	.1Ω	†5.6KΩ	■0Ω	320Ω		
V 7	6AU6	330KΩ	0Ω	0Ω	.1Ω	†92Ω	■ 0Ω	82Ω		
V 8	6T8	600KΩ	15KΩ	600KΩ	0Ω	.1Ω	0Ω	0Ω	4.7Meg	†470KΩ
V 9	6W6GT	INF	0Ω	†410Ω	†360Ω	■120KΩ	INF	.1Ω	22KΩ	
V 10	12AT7	■820KΩ	3.9Meg	0Ω	0Ω	0Ω	■22KΩ	22KΩ	0Ω	.1Ω
V 11	6BL7GT	3.5Meg	▲2.4Meg	0Ω	2.7Meg	▲6.6KΩ	1.4KΩ	.1Ω	0Ω	
V 12	6SN7GT	1.5Meg	†38KΩ	430KΩ	480KΩ	†68KΩ	0Ω	.1Ω	0Ω	
V 13	6BQ6GT	INF	.1Ω	INF	†9KΩ	470KΩ	†68KΩ	0Ω	100Ω	TOP CAP ▲16Ω
V 14	6W4GT	INF	INF	5Meg	INF	†92Ω	INF	▲9Ω	▲9Ω	
V 15	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲265Ω
V 16	5U4G	INF	300KΩ	INF	30Ω	INF	28Ω	INF	300KΩ	
V 17	21WP4	0Ω	160KΩ	PIN 10 ▲5.6KΩ	PIN 11 ■170KΩ	PIN 12 .1Ω				

† MEASURED FROM YELLOW LEAD OF L31
■ MEASURED FROM PIN 8 OF V9
▲ MEASURED FROM PIN 3 OF V14



TUBE PLACEMENT CHART

SET 236 FOLDER 9

MUNTZ MODELS 317TI, 321CI, 321DI, 321T3, 321T4, 321T5 (Ch. 37A4, 37B4, 37C4)

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V12, V13, V14 and V16. Check adjustments B4 and B5. Check waveform W13.

If Satisfactory	If Unsatisfactory
Check T3, T5A, C80, C82, C83, C84, R81, R82 and other associated components.	Check C77, C78, C79, C81, R73, R78, R79, L30 and other associated components.

DRIVE LINES

Check adjustment B4. Check by substitution V13 and V14. Check C83, C84, T3, T5A and other associated components for failure or change of value.

COMPRESSED LEFT SIDE

Check by substituion V13 and V14. Check components associated with the horizontal output and damper stages, especially T3 and T5A.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V13 and V14. Check T3, T5A, T6 and other associated components.

XMAS TREE EFFECT

Substitute V12. Check adjustments B1 and B2. Check L30, C76, C77, C79 and other associated components.

VERTICAL

LOSS OF SWEEP

Substitute V11. Check waveform W7.

If Satisfactory	If Unsatisfactory
Check T4, T5B, R63, R6A and other associated components.	Check T2, C67, R62, R61, R7 and other associated circuit components.

INSUFFICIENT SWEEP

Check adjustment of height and vertical linearity controls. Proceed as outlined under "Loss of Sweep".

COMPRESSED AT BOTTOM

Substitute V11. Check T4, T5B, C2C and other associated components.

COMPRESSED AT TOP

Substitute V11. Check T2, C67, R62 and other associated components.

FOLDS

Substitute V11. Check associated components for failure or change of value.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Substitute V10. Check associated components especially C61, R53, R56, C62 and R52.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Check by substitution V10 and V11. Check waveform W5.

If Satisfactory	If Unsatisfactory
Check components associated with V11B.	Check vertical integrator and other associated circuit components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Substitute V12. Check adjustments B1, B2 and B3. Check L30, C76, C79, C77 and other associated circuit components.

HORIZONTAL BENDING

Subwtittte V12 and V13. Check C73, C74 and C75. Check sync signal for low frequency modulation.

VIDEO

LOSS OF VIDEO

Substitute V6. Check C49. C46, R36, R39, R1A, R4A, L23, L25, L24, picture tube and other associated circuit components.

SOUND BA RS (4. 5MC BEAT)

Adjust tuner fine tuning for best picture and sound. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check contrast control, C46, C49, L23, L25, picture tube and other associated circuit components.

NEGATIVE PICTURE

Substitute V6. Check video detector crystal and assembly. Check AGC network for component failure. Check picture tube.

SMEAR

Substitute V6. Check video detector crystal and assembly. Check C46, C49, R36, R39, R1A, R4A, L23, L25, picture tube and other associated components for failure or change of value.

WIDE BLACK BAR ACROSS PICTURE

Check V1, V2, V3, V4, V5 and V6 for heater to cathode leakage. Check B+ filter capacitors for open.

AUDIO

WEAK OR NO SOUND

Check by substitution V7, V8, V9. Check stages V8B and V9 using audio signal generator. Apply audio signal across R47.

If Satisfactory	If Unsatisfactory
Chech ratio detector and audio IF alignment and components.	Check components associated with V8B and V9.

BUZZ

Adjust tuner fine tuning for best picture and sound. Check adjustment A10. If still unsatisfactory substitute V8 and realign ratio detector and audio IF stages.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

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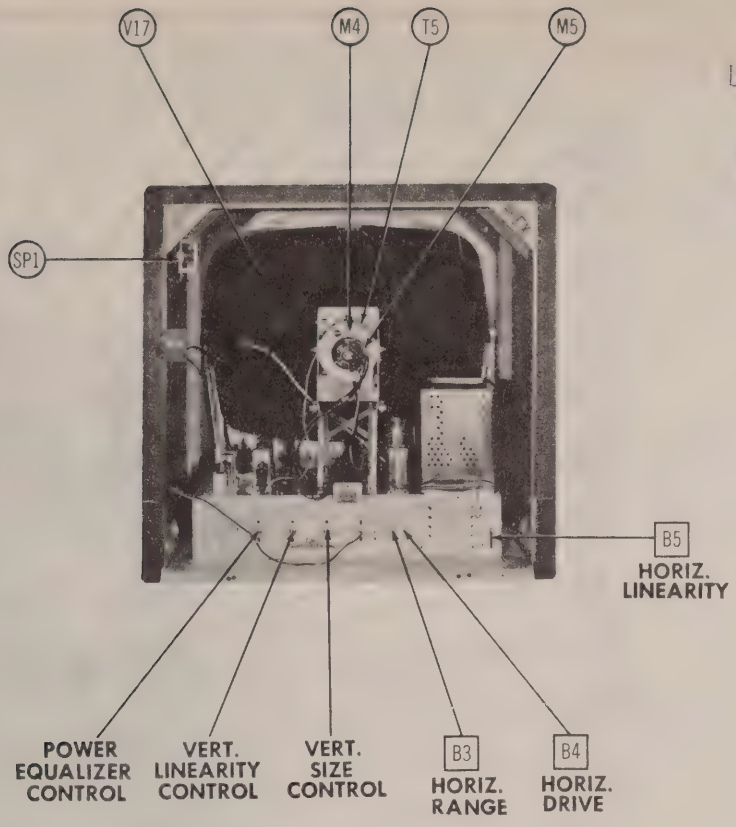

CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Preset the horizontal frequency slug (B1) and the horizontal waveform slug (B2) in maximum counter clockwise direction.

Short terminals "C" and "D" of L30 (horizontal oscillator coil) with a jumper wire.

Preset the horizontal range trimmer (B3) 1/4 turn from fully clockwise.

Turn the horizontal hold control fully clockwise.

Adjust B1 until picture synchronizes, retouching B3 slightly if necessary.

Remove the short from terminals "C" and "D" of L30. The picture should remain in sync. If it does not, readjust B3 or B1 to sync the picture. Connect an oscilloscope through a 5 MMF capacitor to terminal "C" on L30. Connect the low side to chassis.

Adjust B2 for a waveform as in Fig. 7 with broad and narrow peaks of equal height. Be sure to keep picture in sync while adjusting B2. Remove the scope. Set the horizontal hold control to fully clockwise position. Adjust B1 for 1 vertical blanking bar. Rotate the horizontal hold control fully counter clockwise. The picture should remain in sync.

Adjust the horizontal drive trimmer (B4) counter clockwsie as far as possible without the presence of vertical white lines or compression near the center of the picture. (Note: If B4 is adjusted the Ion trap setting should be checked).

Adjust the linearity coil slug (B5) for a picture that is symmetrical from left to right.

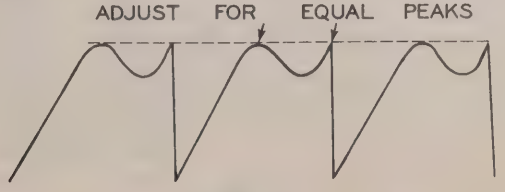

FIG. 7

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DENVER, COLORADO

MUNTZ MODELS 317T1, 321C1, 321D1, 321T3, 321T4, 321T5 (Ch. 37A4, 37B4, 37C4)

CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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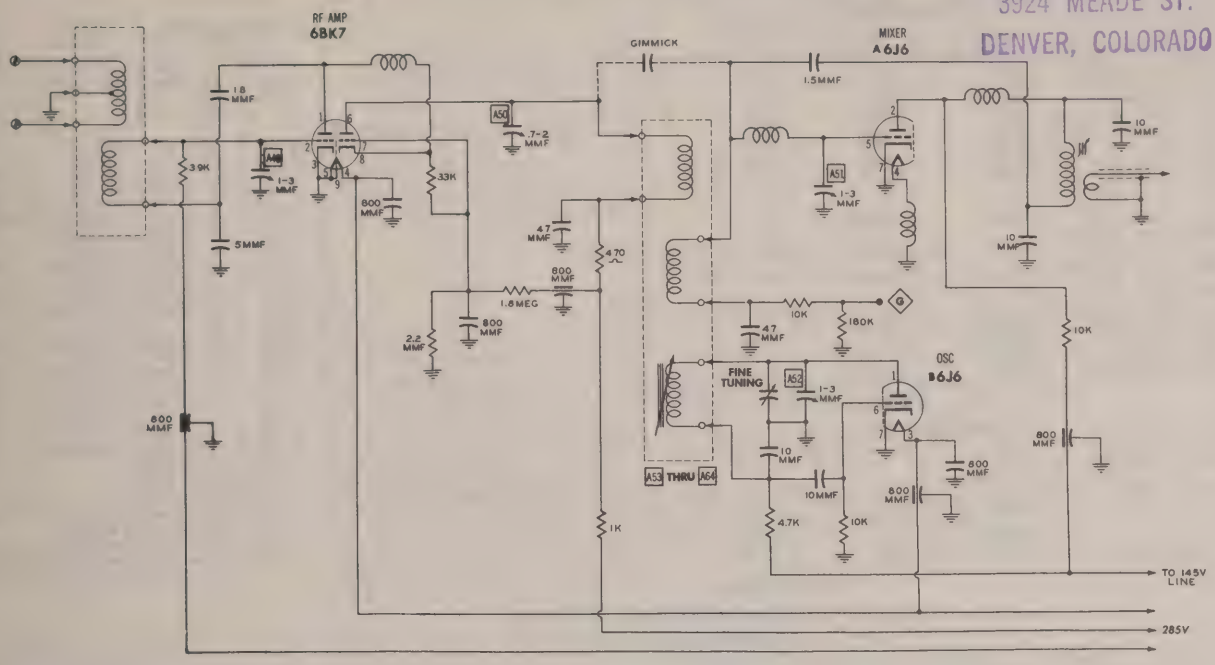

ALTERNATE TUNER PART NO-PR-0206 USED IN SOME MODELS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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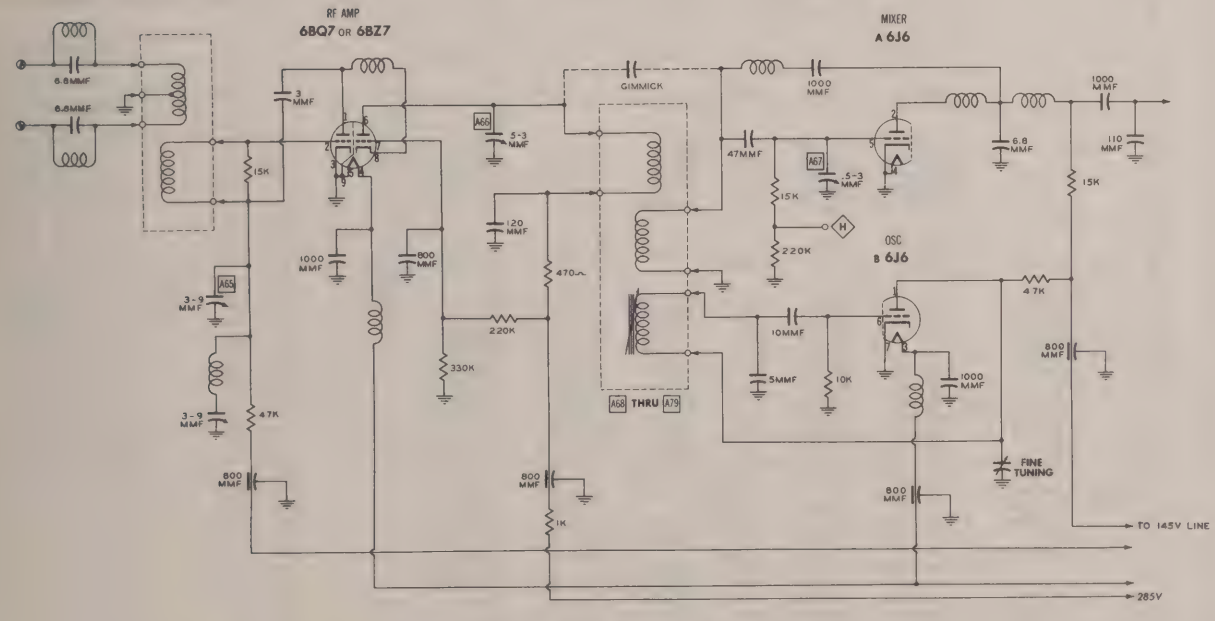
ALTERNATE TUNER SCHEMATIC



ALTERNATE TUNER PART NO. PR-0207 USED IN SOME MODELS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALTERNATE TUNER SCHEMATIC

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3924 MEADE ST.
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: MUNTZ PART No.	STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1A	RF Amplifier	6DZ7	6BZ7	9AJ	
B	RF Amplifier	6DQ7A	6BQ7A	9AJ	
V2	Converter	6X8	6X8	9AK	
V3	1st Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Output	6CB6	6CB6	7CM	
V7	Sound IF Amp.	6AU6	6AU6	7BK	
	Ratio Detector - AF Amplifier	6T8	6T8	9E	
V9	Audio Output	6W6GT	6W6GT	7S	
V10	Sync Amplifier - Sync Separator	12AT7	12AT7	9A	
V11	Vert. Oscillator - Vert. Output	6BL7GT	6BL7GT	8BD	
V12	Horiz AFC - Horiz. Oscillator	6BN7GT	6BN7GT	8BD	
V13	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V14	Damper	6W4GT	6W4GT	6CG	
V15	HV Rectifier	1B3GT	1B3GT	3C	
V16	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: MUNTZ PART No.	SYLVANIA PART No.	GENERAL ELECTRIC PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V17A	21WP4				12N	① Circuit change necessary
B	21EP4A	21EP4A	21EP4A	21EP4A	12N	
C		21KP4 ①		21EP4B		
D	17BP4A	17BP4A	17BP4A	17BP4A	12N	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: MUNTZ PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	40	450	CE-0028	APH3-159		C1B		FP375	TVL-3764	
B	40	450								
C	100	200								
C2A	40	450	CE-0033	APH3-142		C1B9		FP375	TVL-3764	
B	40	450								
C	100	50								
C3	40	250	CE-0094	PRS250/40		BR4025		TC56	TVA-1511	
C4	4	50	CE-0031	PRS150/4		BR415		TC30	TVA-1402	
C5	33			S33	D6-330	TP33	GP1K-330	UC-5422	5GA-Q33	
C6	47			S47	D6-470	TP39	GP1K-470	UC-5447	5GA-Q47	
C7	3.9									
C8	680			BPD-0068	DD-681	KD69	501-001	DC-531	5HK-D1	
C9	470			BPD-00047	DD-471	KD69	521-471	UC-5347	5GA-T47	
C10	680			BPD-0068	DD-681	KD69	501-001	DC-531	5HK-D1	
C11	1800			BPD-0018	DD-182	KD71	501-0015	DC-5215	5HK-D15	
C12	470			BPD-00047	DD-471	KD60	531-471	UC-5347	5GA-T47	
C13	.33									
C14	.4									
[illegible]	2									
C16	47			S47	D6-470	TP39	GP1K-470	UC-5447	5GA-Q47	
C17	.75									
C18	1.5									
C19	18			S18N2P0	TCZ-18	T200	MP0K-180	ZT-541	5TCC-Q1	
C21	1.8									
C22	680			BPD-001	DD-102	KD69	501-001	DC-521	5HK-D1	
C23	680			BPD-0068	DD-681	KD69	501-001	DC-531	5HK-D1	
C24	1800			BPD-001	DD-102	KD69	501-001	DC-531	5HK-D1	
C25	680			BPD-0068	DD-681	KD69	501-001	DC-531	5HK-D1	
C26	18			S18N2P0	TCZ-18	T200	MP0K-180	ZT-541	5TCC-Q1	
C27	150									
C28	7.5									
C29	1800			BPD-001	DD-102	KD69	501-001	DC-531	5HK-D1	
C30	.22	300	CP-0055	P288-22		CUB2P22		PT4022	2TM-P22	Note 2
C31	47									Note 2
C32	370		CC-0094	S2370	D6-371	TP41	GP2K-371	UC-5327	5GA-T27	
C33	1500		CC-0114	BPD-0015	DD-152	KD71	501-0015	DC-5215	5HK-D15	
C34	1500		CC-0117	BPD-001	DD-102	KD69	501-001	DC-521	5HK-D1	
C35	1500		CC-0114	BPD-0015	DD-152	KD71	501-0015	DC-5215	5HK-D15	
C36	1500		CC-0117	BPD-001	DD-102	KD69	501-001	DC-521	5HK-D1	
C37	1500		CC-0114	BPD-0015	DD-152	KD71	501-0015	DC-5215	5HK-D15	
C38	1500		CC-0114	BPD-0015	DD-152	KD71	501-0015	DC-5215	5HK-D15	
C39	5000		CC-0060	BPD-006	DD-502	KD60	511-006	DC-525	5HK-D5	
C40	1500		CC-0117	BPD-001	DD-102	KD69	501-001	DC-521	5HK-D1	
C41	1000		CC-0117	BPD-001	DD-102	KD69	501-001	DC-531	5HK-D1	
C42	1500		CC-0114	BPD-0015	DD-152	KD71	501-0015	DC-5215	5HK-D15	
C43	1500		CC-0114	BPD-0015	DD-152	KD71	501-0015	DC-5215	5HK-D15	
C44	6.8		CC-0116	S6.8N2P0	TCZ-6.8	T200	MP0K-6R8	ZT-5568	5TCC-P-V68	
C45	.22	300	CP-0055	P288-22		CUB2P22		PT4022	2TM-P22	
C46	.1	600	CP-0034	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C47	5000		CC-0060	BPD-006	DD-502	KD60	511-006	DC-525	5HK-D5	
C48	47			S47N750	TCN-47	N030	N750-501-470	NT-5447	5TCU-Q47	
C49	.1	600	CPM-0107	P488-1	DF-104	CUB4P1		PT601	6TM-P1	
C50	6.8			S6.8N2P0	TCZ-6.8	Z033	MP0-831-6R8	ZT-5568	5TCCB-V68	
C51	30			S30N2P0	TCZ-30	Z033	MP0-831-300	ZT-543	5TCC-Q2	
C52	5000		CC-0060	BPD-006	DD-502	KD60	511-006	DC-525	5HK-D5	Note 3
C53	5000		CC-0060	BPD-006	DD-502	KD60	511-006	DC-525	5HK-D5	
C54	5000		CC-0060	BPD-006	DD-502	KD60	511-006	DC-525	5HK-D5	
C55	370		CC-0094	S2370	D6-371	TP41	GP2K-371	UC-5327	5GA-T27	
C56	1500		CC-0061	S2000	D6-202	TP52	GP3L-102	UC-531	5HK-D1	
C57	.01	600	CP-0041	P488-01	D6-103	CUB6B1	GP2-333-103	PT611	6TM-B1	
C58	.01	600	CP-0041	P488-01	D6-103	CUB6B1	GP2-333-103	PT611	6TM-B1	
C59	.022	600	CPM-0382	P688-022		CUB6D22		PT6223	6TM-S22	
C60	270		CC-0094	S2370	D6-371	TP41	GP2K-371	UC-5327	5GA-T27	

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: MUNTZ PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C61	.01	600	CPM-0101	P688-01	D6-103	CUB6B1	GP2-333-103	PT611	6TM-B1	
C62	.047	600	CPM-0395	P688-047	DF-503	CUB6B47		PT6147	6TM-S47	
C63A	.002							PT632		
B	.005			sPA-110-*	sPC-100	sMST-M1	s1405-01	PT635	s105C1	
C	.005							PT635		
C64	.0022	600	CPM-0100							
C65	.047	600	CP-0047							
C66	1000		CC-0061	SU000	D6-102	TP62	GP2L-102	UC-521	5HK-D1	
C67	.1	600	CP-0013	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C68	.1	600	CP-0013	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C69	.0022	600	CP-0056	P688-0022	D6-222	CUB6D22	GP2-333-223	PT6223	6TM-D22	
C70	47	500	CM-0044	1469-00005		22R5Q47		MC5225	M5-45	
C71	68	1000	CM-0101							
C72	.047	600	CPM-0104	P688-047	DF-503	CUB6S47				
C73	.047	600	CPM-0105					PT6147	6TM-S47	
C74	.022	200	CP-0053	P488-022		CUB4Z22		PT4122	4TM-Z22	
C75	.47	200	CP-0045	P288-47		CUB2P47		PT4047	2TM-P47	
C76	180		CC-0119							
C77	.01	600	CPM-0101	P688-01		CUB6B1		PT611	6TM-B1	
C78	820	500	CM-0046			1R7T82				
C79	1000	1000	CC-0112	HVD15-001		VD1	1R5KV-102	MC5210	10GA-D1	
C80	.1	600	CP-0013	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C81	.22	200	CPM-0106	P288-22		CUB2P22		PT4022	2TM-P22	
C82	.1	600	CP-0013	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C83	.047	600	CP-0049	P688-047		CUB6B47		PT6147	6TM-S47	
C84	.033	600	CPM-0103	P688-033				PT6133		
C85	56	2000					3KV-560		30GA-Q56	
C86	10000	1000								Note 4
C87	10000	1000								Note 4

Note 1. Some Models use 8MFD in this application (part #CH-0035).
Note 2. Not used in all Models.
Note 3. Run 1 chassis use 470MMF in this application.
Note 4. Some Models use 10000MMF ⑤ 1500VAC in this application (part #CC-0126).
* Items C63A, C63B, C63C, R57A, R57B, R57C are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: MUNTZ PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1500Ω	½	VC-0040-C		RTV-316		UF153L	Contrast (Panel)
B	500KΩ	½	Not Req.				UR55A †	Volume (Rear)
C	Switch		Not Req.				UB-36	Attach to R1B
R2A	50KΩ	½	VC-0036E	Q1-123	AG-44-8	AB-31	U-35	Horiz. Hold
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R2A
R3A	2.5Meg	½	VC-0046	Q1-239	AG-94-8	AB-33	U-355	Vert. Hold
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R3A
R4A	50KΩ	½	VC-0036E	Q1-123	AG-44-8	AB-31	U-35	Brightness
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R4A
R5A	2 Meg	½	VC-0034F	Q1-139	AG-83-8	AB-75	SU-58	Power equalizer Note 1
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-1	Not Req.	Attach to R5A
R6A	2500Ω	½	VC-0037	Q1-112	AG-15-8	AB-7	U-8	Vert. Linearity
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-1	Not Req.	Attach to R6A
R7A	2 Meg	½	VC-0034F	Q1-139	AG-83-8	AB-75	SU-58	Vert. Size
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-1	Not Req.	Attach to R7A

Note 1. Not used in all models.
† Universal replacement (Mallory exact duplicate Part No. UR170S).

RESISTORS

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: MUNTZ PART No.	IRC PART No.	NOTES
R8	15KΩ	½	RC-1502-18	BTS-15K	
R9	1 Meg 5%	½	RC-1004-58	BTS-1 Meg 5%	
R10	750KΩ 5%	½	RC-7503-58	BTS-750K 5%	
R11	470Ω	½	RC-470-18	BTS-470	
R12	1000Ω	½	RC-1001-18	BTS-1000	
R13	3900Ω	½	RC-3901-18	BTS-3900	
R14	220KΩ	½	RC-2203-18	BTS-220K	
R15	2200Ω	½	RC-2201-18	BTS-2200	
R16	1000Ω	½	RC-1001-18	BTS-1000	
R17	15KΩ	½	RC-1502-18	BTS-15K	
R18	220Ω	½	RC-220-18	BTS-220	
R19	4700Ω	½	RC-4701-18	BTS-4700	
R20	1000Ω	½	RC-1001-18	BTS-1000	
R21	27KΩ	½	RC-2702-18	BTS-27K	
R22	47Ω	½	RC-047-18	BTS-47	
R23	33KΩ	½	RC-3302-18	BTS-33K	
R24	680Ω	½	RC-680-18	BTS-680	
R25	1000Ω	½	RC-1001-18	BTS-1000	
R26	680Ω	½	RC-680-18	BTS-680	
R27	47Ω	½	RC-047-18	BTS-47	
R28	680Ω	½	RC-680-18	BTS-680	
R29	180Ω	½	RC-1180-18	BTS-180	
R30	680Ω	½	RC-680-18	BTS-680	
R31	10KΩ	3	RC-1002-12	BTS-10K	
R32	4700Ω	½	RC-1401-18	BTS-4700	
R33	22KΩ	½	RC-2202-18	BTS-22K	
R34	820KΩ	½	RC-8203-18	BTS-820K	
R35	1.2Meg	½	RC-1204-18	BTS-1.2Meg	
R36	5600Ω	2	RC-5601-12	BTS-5600	
R37	10KΩ	½	RC-1002-18	BTS-10K	
R38	330KΩ	½	RC-3303-18	BTS-330K	
R39	100KΩ	½	RC-1003-18	BTS-100K	
R40	330KΩ	½	RC-3303-18	BTS-330K	Note 1
R41	82Ω	½	RC-820-18	BTS-82	
R42	470Ω	½	RC-470-18	BTS-470	
R43	100KΩ	½	RC-1003-18	BTS-100K	
R44	15KΩ	½	RC-1502-18	BTS-15K	
R45	15Ω	½	RC-015-28	BTS-15	
R46	270Ω	½	RC-270-18	BTS-270	
R47	4.7Meg	½	RC-4704-28	BTS-4.7Meg	
R48	470KΩ	½	RC-4703-18	BTS-470K	
R49	2.2Meg 5%	½	RC-2204-58	BTS-2.2Meg 5%	

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: MUNTZ PART No.	IRC PART No.	NOTES
R50	120KΩ 5%	½	RC-1203-58	BTS-120K 5%	
R51	270Ω	3	RC-270-12		
R52	3.3Meg	½	RC-3304-18	BTS-3.3Meg	
R53	820KΩ	½	RC-8203-18	BTS-820K	
R54	22KΩ	½	RC-2202-18	BTS-22K	
R55	330KΩ	½	RC-3303-18	BTS-330K	
R56	22KΩ	½	RC-2202-18	BTS-22K	
R57W	22KΩ	½			
H	820Ω	½	*		
C	8200Ω	½			
R58	150KΩ	½		BTS-150K	
R59	910Ω 5%	½	RC-9101-58	BTS-910Ω 5%	
R60	2.7 Meg	½	RC-2704-18	BTS-2.7Meg	
R61	1.2Meg	½	RC-1204-18	BTS-1.2Meg	
R62	2.7Meg	½	RC-2704-18	BTS-2.7Meg	
R63	680Ω	½	RC-680-18	BTS-680	
R64	560Ω	½		BTS-560	
R65	560Ω	½		BTS-560	
R66	22KΩ	½	RC-2202-18	BTS-22K	
R67	8200Ω	½	RC-8201-18	BTS-8200	
R68	2.2Meg	½	RC-2204-18	BTS-2.2Meg	Note 1
R69	330KΩ	½	RC-3303-18	BTS-330K	
R70	820KΩ	½	RC-8203-18	BTS-820K	
R71	100KΩ	½	RC-1003-18	BTS-100K	
R72	330KΩ	1	RC-3303-11	BTA-330K	
R73	150KΩ	1	RC-1503-11	BTA-150K	
R74	4700Ω	½	RC-4701-18	BTS-4700	
R75	100KΩ	½	RC-1002-18	BTS-100K	
R76	22KΩ	½	RC-2202-18	BTS-22K	
R77	10KΩ	½	RC-1002-18	BTS-10K	
R78	470KΩ	½	RC-4703-18	BTS-470K	
R79	10KΩ	½	RC-1002-18	BTS-10K	
R80	100Ω	2	RC-100-12		
R81	18KΩ	2	RC-1802-12	BTB-18K	
R82	18KΩ	2	RC-1802-12	BTB-18K	
R83	68KΩ	1	RC-6802-11	BTA-68K	
R84	150KΩ	1	RC-1503-11	BTA-150K	
R85	5600Ω	2	RC-5601-12	BTB-5600	
R86	1000Ω	½		BTS-1000	
R87	3.9Ω		RC-004-18		
R88	820KΩ	½	RC-8203-18	BTS-820K	
R89	4700Ω	½		BTS-4700	Note 2

Note 1. Some models may use a 470KΩ resistor in this application.
Note 2. Not used in all models.
* Items R57A, R57B, R57C, C63A, C63B, C63C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	SEC. 1	SEC. 2	REPLACEMENT DATA: MUNTZ PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Hallderson PART No.	Thorderson PART No.
T1	117VAC	575VCT	5VAC	TP-0020 ①						
	①1.83A	.300ADC	⑨3A	TP-0019 ②						
				TP-0023 ③						
	SEC. 3	SEC. 4	SEC. 5	TP-0024 ④						
	6.3VAC	6.3VAC								
	⑥1.2A	⑨ 8A								

① Transformer has tube socket mounted off center.
② Alternate power transformer.
③ 50 Cycle 110V or 220V input transformer.
④ 117V 50 Cycle transformer

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: MUNTZ PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Hallderson PART No.
T2	Vert. Osc. Trans.	TO-0038	A-8125	A-3003	A-97X	209T1 ⑤	B6702
T3	Horiz.Output Trans.	TO-0031-2	A-8123	HVO-⑫ ②	D-19⑫ ③	225T1 ④	FB413
						②	
T4	Vert. Output Trans.	TO-0034-2	A-8123	A-3037	A-102X	222T1	Z1804
T5A	Yoke-Horiz.(23MM)	DY-8A		MDY-72	Y-17	211D2	DF502
B	Yoke-Vert. (44MM)						
T6	Horiz. Lin. Coil (1.1-4.2MH) (Tapped)	LR-0084	WC-6 ④	MWC-5⑤		209R1 ⑤	

① Drill new mounting holes.
② Connect original terminal #7 to new terminal #9. Remove horizontal lin. coil from cathode of damper tube (V14) & connect in plate circuit as shown on instruction sheet packed with unit leaving center tap disconnected. Connect damper cathode to terminal #8. Connect original terminal #4 to new terminal #5, original #3 to #4, original #1 to new #1. Connect C63 from damper plate to terminal #1. Connect yoke return thru C62 to terminal #1.
③ Connect original terminal #7 to new terminal #9, original #8 to new #8, original #6 to new #7, original #4 to new #6, original #3 to new #4, original #1 to new #1.
④ Drill new mounting hole in rear of chassis or use hole on top of chassis thru which core of original unit extended.
⑤ Drill one new mounting hole.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC	REPLACEMENT DATA: MUNTZ PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Hallderson PART No.	Thorderson PART No.	NOTES
T7	2.8KΩ	3.3Ω	TO-0033	A-3825①	A-3018	S-4X ①	Z1010		① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: MUNTZ PART No.	VIKING PART No.	QUAM PART No.	NOTES
SP1A	5 1/4"	PM	3.2Ω	SK-0019-2 ①	525J4	52A1	① Used on models 317T1 and 321C1.
B	10"	PM	3.2Ω	SK-0030-2 ②	10J11	10A21	② Used on models 321T4, and 321D1.

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	SEC.	REPLACEMENT DATA: MUNTZ PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Trans.	00CT	0Ω					Low channel Sec. =0Ω
L2	UHF IF Input Coil	0Ω						
L3	UHF IF Input Coil	0Ω						
L4	Ant. Coils	0Ω						
L5	Ant. Coil	0Ω						Channel 13
L6	Neutr. Coil	0Ω						
L7	RF Coil	0Ω						Channel 13
L8	RF Coils	0Ω						
L9	Mixer Grid Coil	0Ω						Channel 13
L10	Mixer Grid Coils	0Ω						
L11	Fil. Choke	0Ω						
L12	Osc. Coils	0Ω						
L13	Osc. Coil	0Ω						
L14	Osc. Plate Coil	00CT						Channel 6 Channel 13
L15	Conv. Plate	.1Ω						
L16	1st Video IF	.1Ω		LI-0050	17-4804		6333 †	Includes trap
L17	RF Choke			LI-0068				Used with tuner Part # PR-0306-3 only.
L18	2nd Video IF	.1Ω	.1Ω	LI-0053			6332 ▲	Includes trap
L19	3rd Video IF	.1Ω	.1Ω	LI-0051	17-4504 ∞		6333 ▲	
L20	4th Video IF	.1Ω	.1Ω	LI-0052	17-4505 #		6334 ▲	
L21	Series Peaking Coil	6.5Ω		LC-0057-2	19-3093	TV-181	4643	105 Microhenries
L22	Shunt Peaking Coil	18Ω		LC-0057-3	19-3980 †	TV-188 †	4680 †	840 Microhenries; wound on 10KΩ resistor
L23	Series Peaking Coil	13Ω		LC-0057-6	19-4250	TV-187	6173	280 Microhenries; wound on 2KΩ resistor
L24	4.5MC Trap	2Ω		LC-0062	20-1004 ■	TV-181 ■	1470 ■	
L25	Shunt Peaking Coil	18Ω		LC-0057-7				600 Microhenries
L26	Sound IF	4.6Ω		LO-0038-1	17-3400	TV-181	1469	
L27	Ratio Det.	4.4Ω	.5OCT	LI-0046	17-1033 *	TV-110 *	1466 *	Tertiary windings. 86Ω
L28	Fil. Choke	.8Ω		LC-0054-1	19-1000	TV-189	4603	1 Microhenry ; IRC Part # CLA
L29	Fil. Choke	.8Ω		LC-0054-1	19-1000	TV-189	4603	1 Microhenry ; IRC Part # CLA

(CONT'D ON NEXT PAGE)

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MUNTZ PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L30	Horiz. Osc.	85Ω		LO-0039	20-1402 ▲	TV-162 ▲	6183 ▲	Pri. tapped @ 60Ω; Horiz. Wave Form Winding= 48Ω

‡ Use secondary and trap windings, drill one new mounting hole and use adaptor plate.
** Tune trap winding to 45MC.
♦ Detune trap windings, drill one new mounting hole and use adaptor plate.
▬ Drill one new mounting hole and use adaptor plate.
† Parallel with 10KΩ resistor.
■ Drill mounting hole.
* Drill mounting holes.
▲ Reverse coil mounting in can.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	MUNTZ PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L31	.200A	92Ω	2.8 Hy.	LC-0059-1	C-2325①	C-2974	C-21X	C5030	

① Drill one new mounting hole.

FUSES

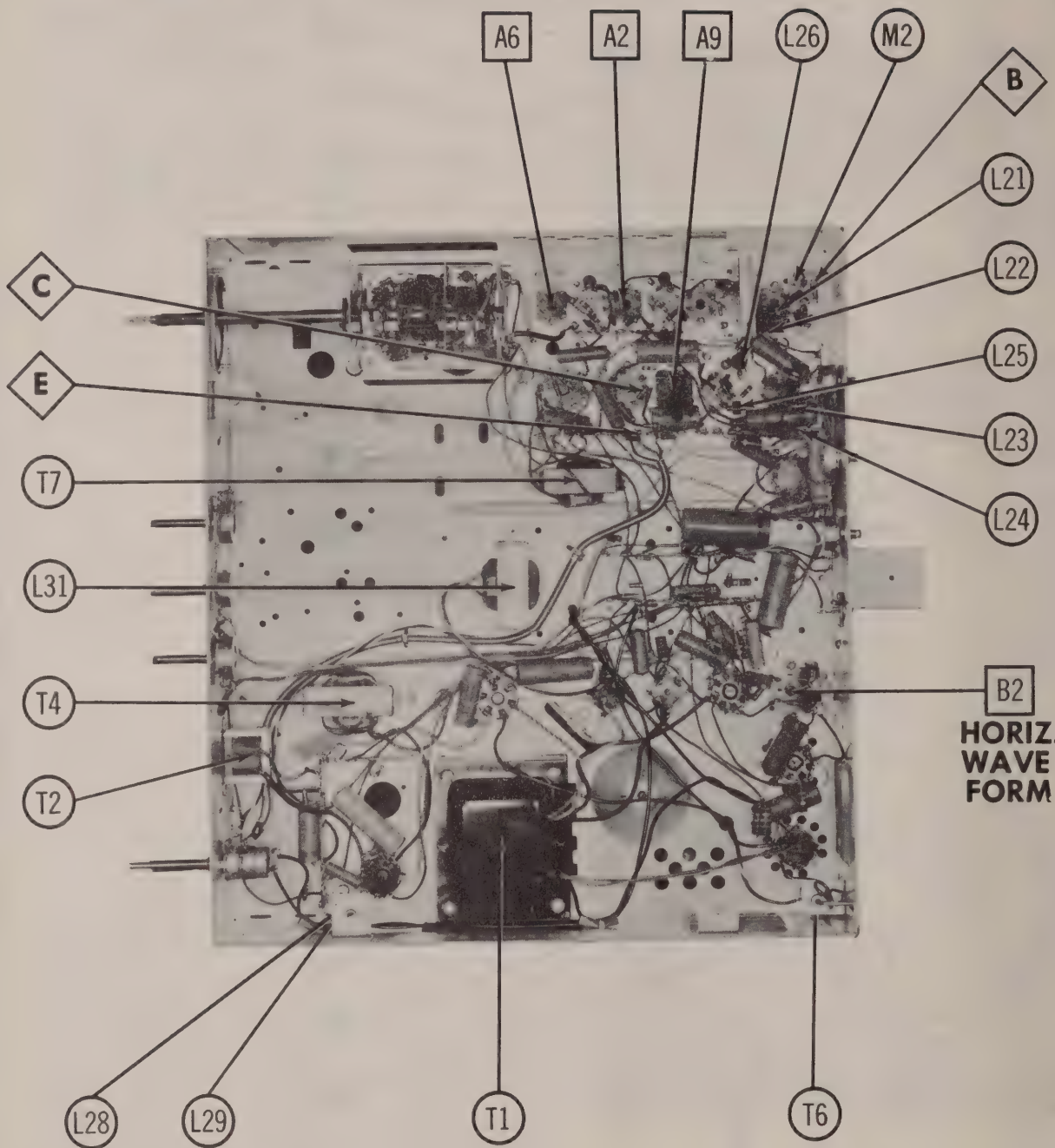
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			MUNTZ PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AGS/B	5A 125V	FU-0005-2		313005. (3AG S/B-5A)	357001	MDX5	4405

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		MUNTZ PART No.	SYLVANIA PART No.		
M2	1N60	CX-0028	1N60		

MISCELLANEOUS

ITEM No.	PART NAME	MUNTZ PART No.	NOTES
M3A	Tuner	PR-0206	Used in chassis with code "G" following RUN number
B	Tuner	PR-0207	Used in chassis with code "S" following RUN number
C	Tuner	PR-0212	Used in chassis with code "T" following RUN number
M4A	Focus magnet	PR-0185	Chassis 37B4, 37C4
B	Focus magnet	PR-0218	Chassis 37A4
M5	Ion trap	PR-0172	
B3, B4	Trimmer cap	CT-0012	Dual 10-160 MMF (Horiz. drive and range adj.)
	Cabinet	CW-0052	Model 317T1 table, leatherette
	Cabinet	CW-0034-6	Model 321T3 table, leatherette brown levant
	Cabinet	CW-0040-1	Model 321T4 table, walnut
	Cabinet	CW-0040-3	Model 321T4 table, mahogany
	Cabinet	CW-0040-4	Model 321T4 table, oak-blonde
	Cabinet	CW-0045	Model 321T5 table, spatter tone
	Cabinet	CW-0039-1	Model 321C1 consolette, walnut
	Cabinet	CW-0039-3	Model 321C1 consolette, mahogany
	Cabinet	CW-0039-4	Model 321C1 consolette, oak-blonde
	Cabinet	CW-0038-1	Model 321D1 consolette, walnut, with doors
	Cabinet	CW-0038-3	Model 321D1 consolette, mahogany with floors
	Cabinet	CW-0038-4	Model 321D1 consolette, oak blonde with doors
	Knob	KB-0040	Chan. select. PR0207 tuner mahogany
	Knob	KB-0040-1	Chan. select. PR0207 tuner tan
	Knob	KB-0043	Chan. select PR0206 tuner mahogany
	Knob	KB-0043-1	Chan. select. PR0206 tuner tan
	Knob	KB-0044	Chan. select. PR0212 tuner mahogany
	Knob	KB-0044-1	Chan. sleect. PR0212 tuner tan
	Knob	KB-0039	Fine tuning-mahogany
	Knob	KB-0039-1	Fine tuning-gold
	Knob	KB-0041	Picture control (Mahogany)
	Knob	KB-0041-1	Picture control (Gold)
	Knob	KB-0042	Volume (Mahogany)
	Knob	KB-0042-1	Volume (Tan)
	Knob	KB-0036	Chan. select (Brown and gold)
	Knob	KB-0037	Fine tuning (Clear)
	Knob	KB-0038	Picture control (Gold and Clear)
	Knob	KB-0032	Volume (Brown and Gold)
	Safety glass	WG-0009	17 inch
	Safety glass	WG-0011	21 inch-used with 21WP4 kinescope
	Safety glass	WG-0014	21 inch-used with 21EP4A kinescope



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

TROUBLE SHOOTING AIDS (cont)

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POWER

DEAD SET

If filaments fail to light, check fuse M1, switch on volume control, AC interlock assembly and T1. If filaments light, substitute V16. Check B+ filter and decoupling network components.

SMALL AND/OR DIM PICTURE

Substitute V16 and V9. Check B+ filter and decoupling network components.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V12, V13, V14 and V15. Check waveform W13.

If Satisfactory	If Unsatisfactory
Check R87, T3, T5A and other associated circuit components.	Check R78, C79, L30 and other associated circuit components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V12, V13, V14 V15 and V16. Follow procedure outlined under "Loss of High Voltage". Check picture tube.

BLOOMING

Check by substitution V12, V13, V14, V15 and V16. Check R87, T3, T5A, C80, R81, R82 picture tube and other associated circuit components.

GENERAL

RASTER SOUND NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER PICTURE NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER NO SOUND NO PICTURE

Check by substitution V1, V2, V3, V4, and V5. Check associated circuit components.

NO RASTER NO SOUND

Follow procedure outlined under "Dead Set".

INTERMITTENT STREAKS

Check video signal for interference pulses. Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the RF Tuner Oscillator Circuit may be accomplished by removing the Channel Selector and Fine Tuning knobs.

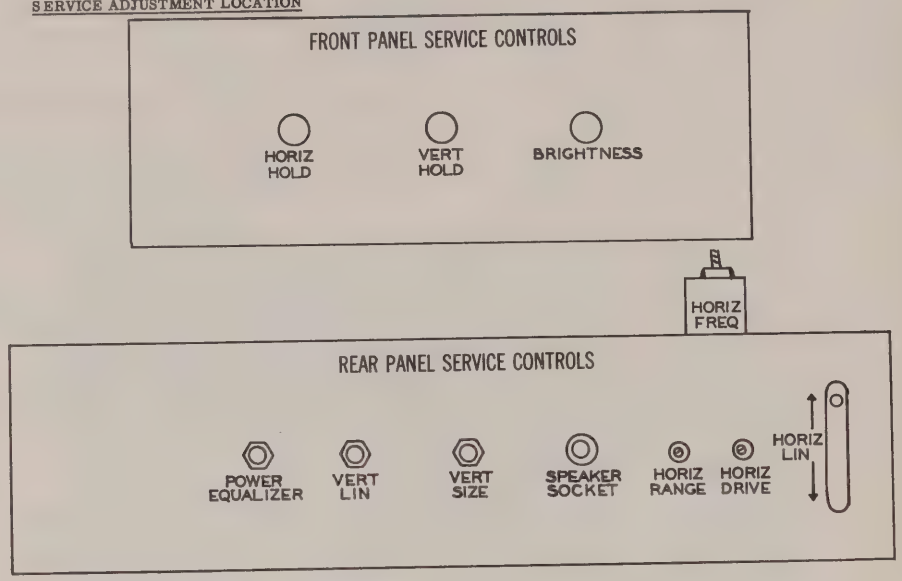
PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety Glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the Horiz. Oscillator, it is necessary to remove the rear cover and supply power to set. Adjustment is located on top of chassis. Set the Horiz. Hold Control at the center of its range and adjust the Horiz. Freq. slug (L30) until, picture synchronizes horizontally. (For location see tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate Sound IF Detector Buzz, adjust the Ratio Detector Secondary (27) located on top of chassis. (See tube placement chart).

FUSES

One fuse is used for L. V. Power Supply protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering lever on the P. M. Focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

Remove 4 push on type control knobs from front panel.

Disconnect built-in antenna and speaker plug.

Remove 2 wood screws. Remove antenna bracket.

Remove 7 wood screws. Remove rear cover.

Remove 4 chassis bolts. Remove chassis.

Remove 4 speaker nuts. Remove speaker.

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PHOTOFACT* Folder

PHILCO MODELS 24B6106, L, 24BU6106, L, 24B6300, 24BU6300 (Ch. D-208, R-207)

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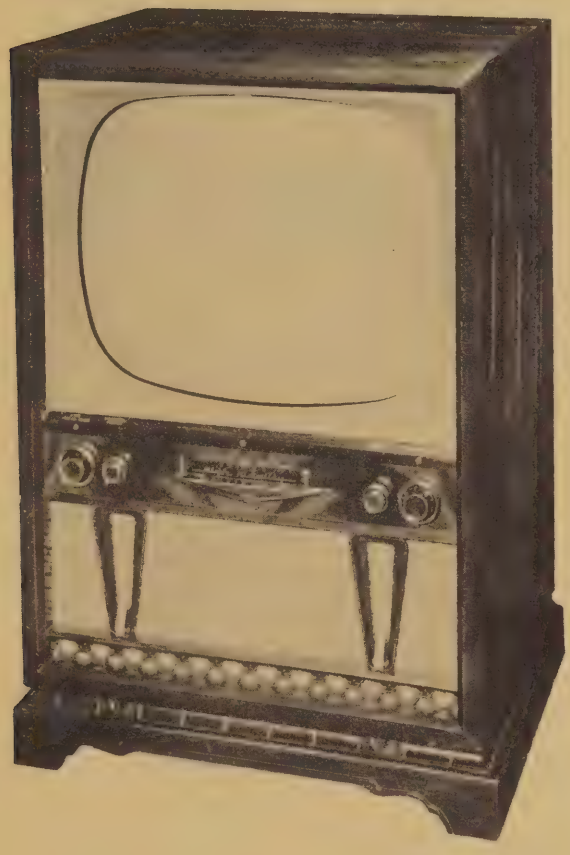

MODEL 24B6106-L

PHILCO MODELS 24B6106, L, 24BU6106, L, 24B6300, 24BU6300 (Ch. D-208, R-207)

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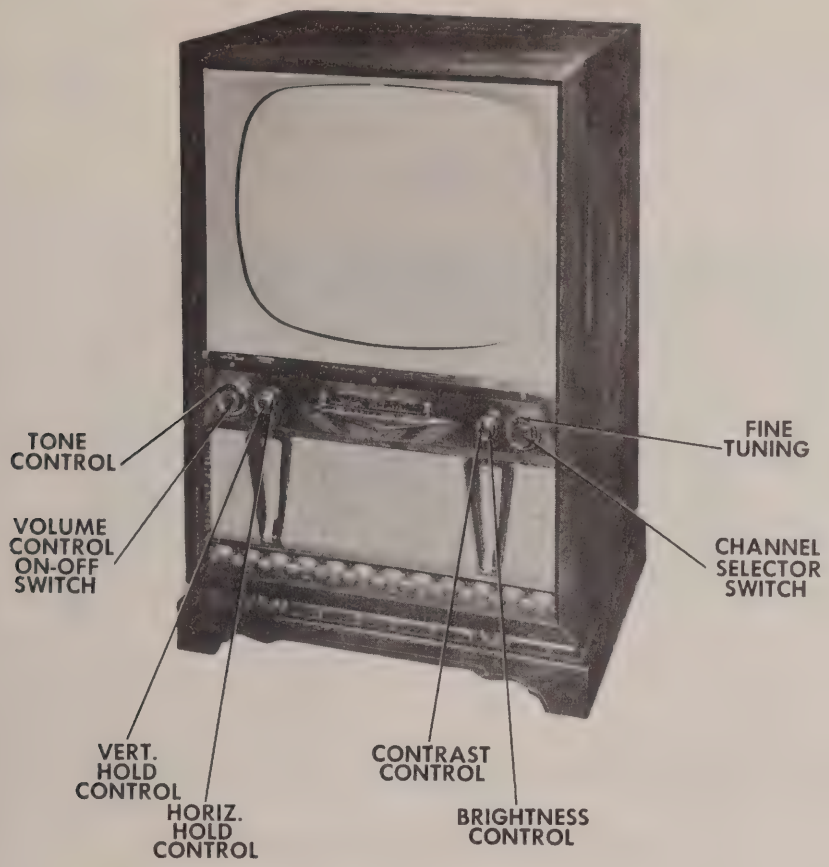

PHILCO MODEL 24B6106-L

TRADE NAME	Philco	MODELS	RF-IF CHASSIS	DEFL. CHASSIS	CODE
		24B6106-L, 24B6300	R-207	D-208	158
		24BU6106-L, 24BU6300	R-207	D-208	158
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.				
TYPE SET	Television Receiver				
TUBES	Twenty-three				
POWER SUPPLY	110-120 Volts AC-60 Cycle		RATING 2.02 Amp. @ 117 Volts AC		
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)				

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PHILCO MODELS 24B6106, L, 24BU6106, L, 24B6300, 24BU6300 (Ch. D-208, R-207)

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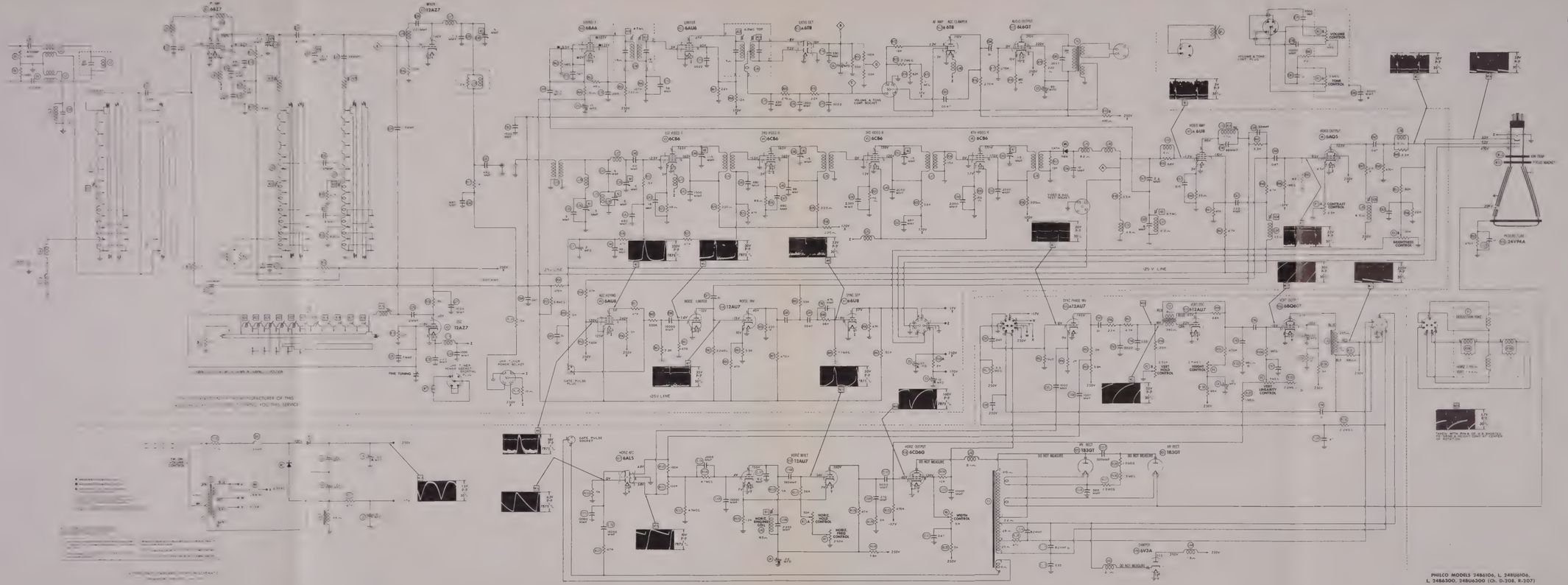

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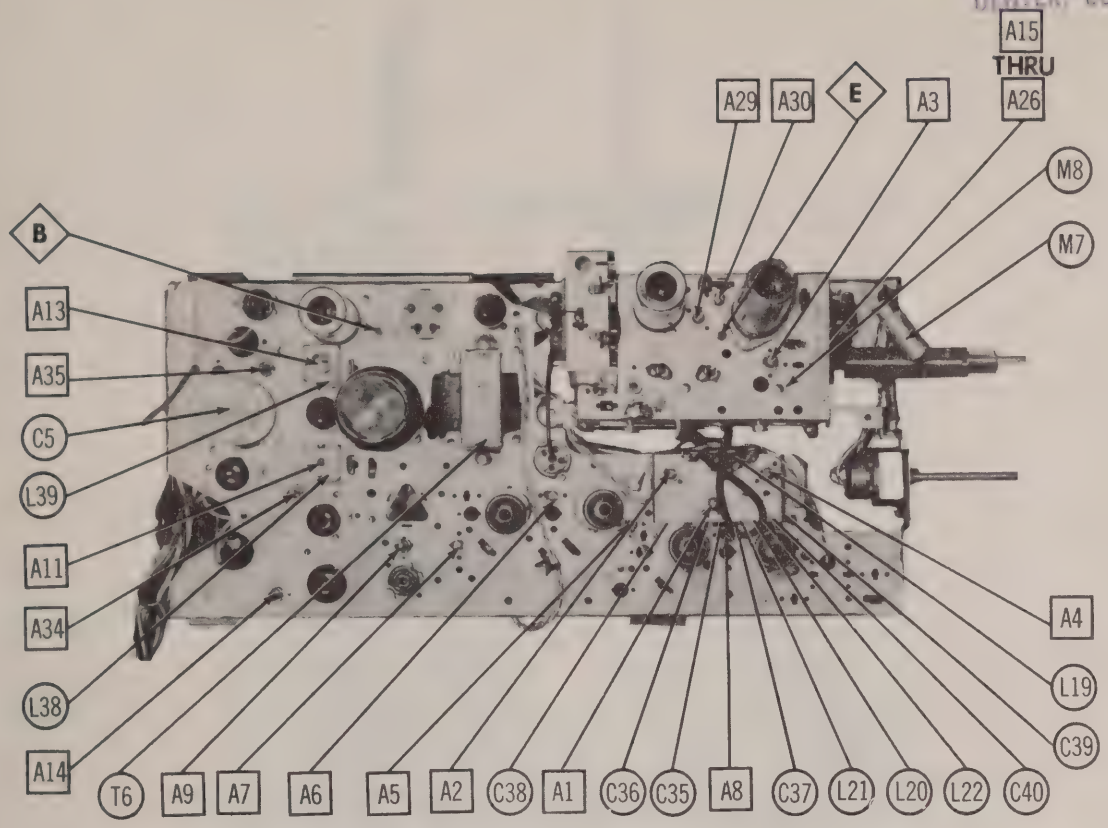
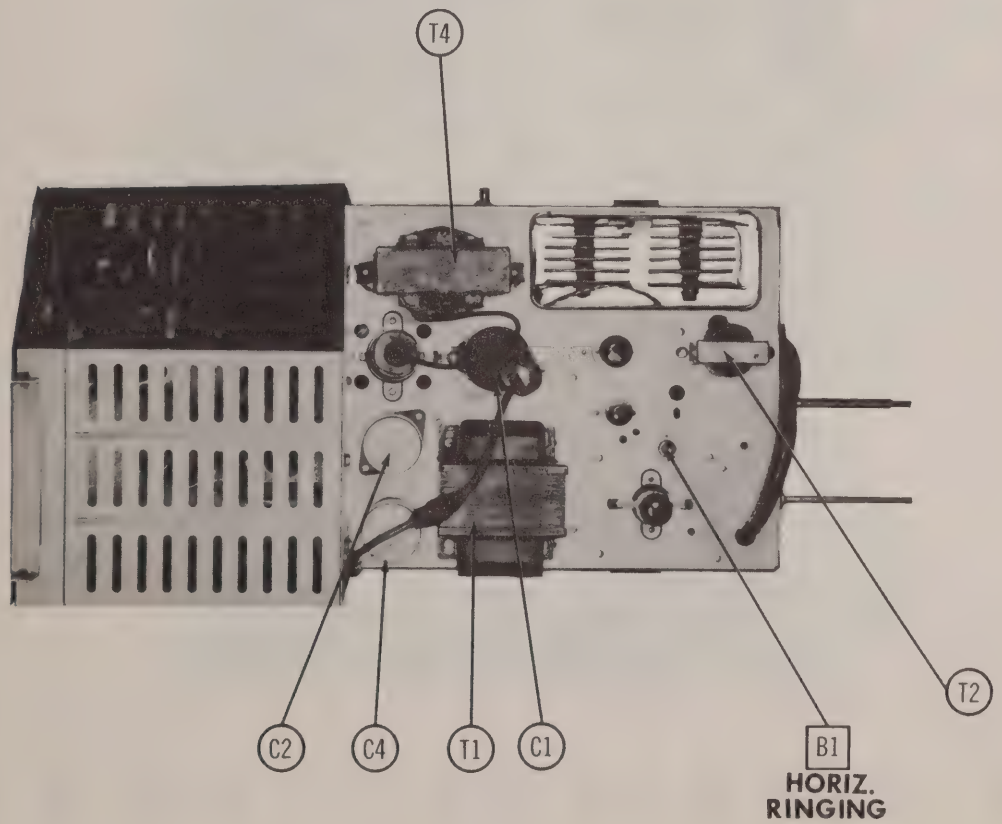
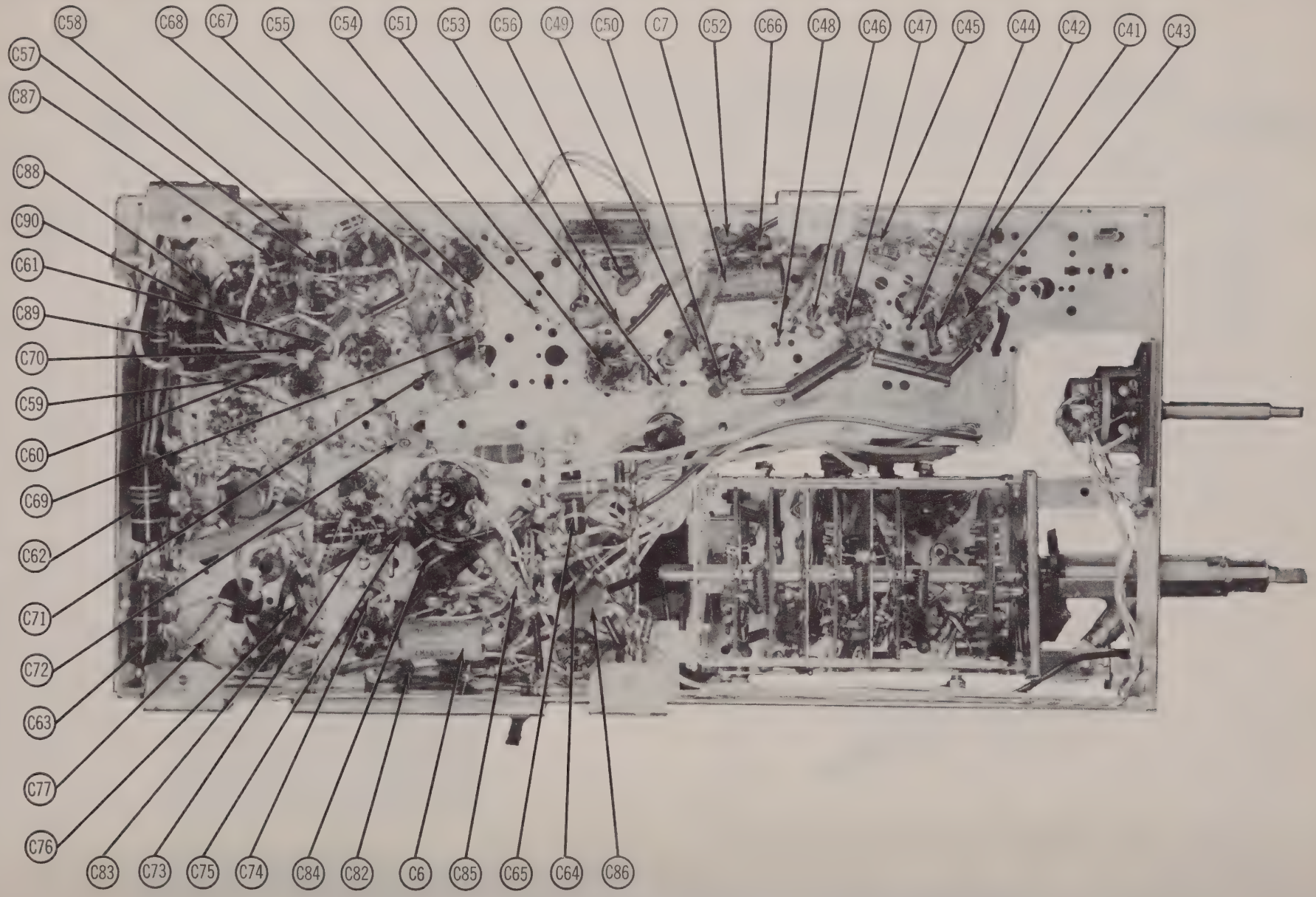


RF-IF CHASSIS-TOP VIEW



SWEEP CHASSIS-TOP VIEW



RF-IF CHASSIS-BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART

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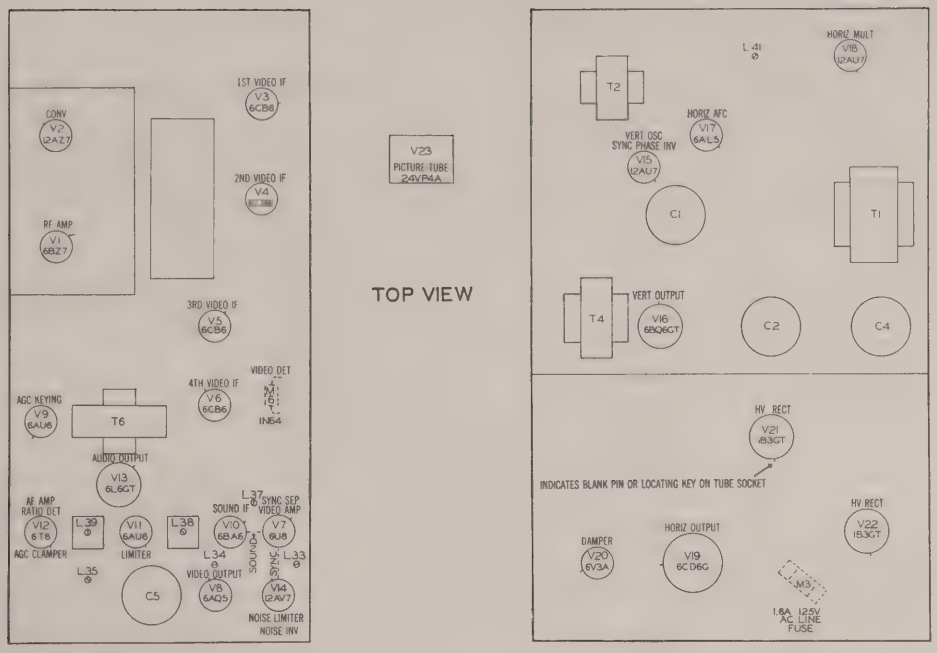

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - Selenium Rectifiers (M1 & M2) Fuses (M3 & M4)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V7, V8, V23
Has pic, no sound - V10, V11, V12, V13
Overloaded picture - V9, V12

SYNC FAILURE
No vert. sync - V15
No horiz. sync - V15, V17, V18
No vert. or horiz. sync - V7, V15

SWEEP FAILURE
No raster, has sound - V18, V19, V20, V21, V22, V23
No vertical deflection - V15, V16
Poor vert. linearity or foldover - V15, V16
Poor horiz. linearity or foldover - V18, V19, V20
Narrow picture - V18, V19, V20, V21, V22, M1, M2
Vert. off freq. - V15
Horiz. off freq. - V15, V17, V18

PHILCO MODELS 24B6106, L, 24BU6106, L, 24B6300, 24BU6300 (Ch. D-208, R-207)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube (V18) to disable the high voltage.
Use an isolation transformer to protect the test equipment.
Allow a 15 minute warm-up period for receiver and test equipment.

VIDEO IF ALIGNMENT

Set the contrast and brightness controls at maximum counter clockwise rotation.
Connect a 10KΩ carbon resistor to pin 1 of the video AGC test jack and another 10KΩ resistor to pin 5 of the same jack. Connect the free ends of the 10KΩ resistors together and attach the negative lead of a 14 volt bias supply to their junction. Connect the positive lead of the bias supply to chassis.
The IF shield must be in place during alignment.
Attenuate generator output during alignment to maintain .6 volt peak to peak on scope at point ◇A◇.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over converter tube (V2). Low side to chassis.	Not used	47.25MC (400% Mod)	4	Vert. Amp. thru 15KΩ to point ◇A◇. (Pin 2 of Video AGC test jack). Low side to chassis.	A1	Adjust for MINIMUM 400% indication on scope. Use sufficient generator output so that a null indication may be observed on scope.
2.	"	"	"	41.25MC	"	"	A2	"
3.	"	"	"	42.7MC	"	"	A3	Adjust for maximum 400% indication on scope.
4.	"	"	"	44.75MC	"	"	A4	"
5.	"	"	"	45.75MC	"	"	A5	"
6.	"	"	"	44.4MC	"	"	A6	"
7.	"	"	"	43.0MC	"	"	A7	"
8.	"	"	"	42.0MC	"	"	A8	Adjust for maximum 400% indication on scope. Increase bias until amplitude of pattern on scope is reduced approximately 50% and then retouch A8 for maximum indication on scope.
9.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	69MC (10MC Swp)	67.25MC	"	"		Loosely couple a second marker generator to the mixer grid test point on top of tuner. Set generator to 45.75MC. Adjust the fine tuning control to zero beat the two markers, as observed on the scope. Remove the second marker generator.
10.	"	"	"	67.25MC 71.0MC	"	"		Alternately adjust A6 and A7 for maximum improvement. A6 affects tilt and A7 affects dip of response curve. Adjust A3 for proper slope at 71MC. Adjust A4 and A5 for proper position of 67.25MC marker. DO NOT RETOUCH setting of A1, A2 and A8.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Leave bias supply connected as under video IF alignment.
Connect two matched 100KΩ (±1%) resistors in series from point ◇B◇ to chassis. The junction of these two resistors is alignment point ◇D◇ as shown on the schematic.
Remove the first video IF tube (V3) from its socket.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
11.	2200Ω Carbon Resistor	High side to point ◇A◇. Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe to point ◇B◇. Common to chassis.	A9, A10, A11, A12	Adjust for maximum deflection. Attenuate generator output to maintain not more than 5 volts at VTVM.
12.	"	"	"	"	DC probe to point ◇C◇. Common to point ◇D◇.	A13	Adjust for zero reading. A positive and negative reading will be obtained on either side of correct setting. Replace V3 in its socket.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Leave bias supply connected as under video IF alignment.
Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.
Remove the first video IF tube (V3) from its socket.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	2200Ω Carbon Resistors	High side to point ◇A◇. Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any non-interfering channel	Vert. Amp. to point ◇B◇. Low side to chassis.	A9, A10, A11, A12	Disconnect stabilizing capacitor C6. Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
12.	"	"	"	"	"	Vert. Amp. to point ◇C◇. Low side to chassis.	A13	Reconnect stabilizing capacitor C6. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A12 for maximum amplitude and straightness of crossover lines. Replace V3 in its socket.

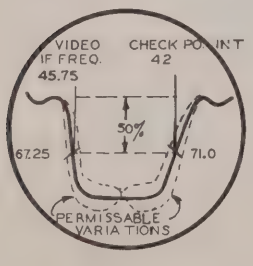

FIG. 1

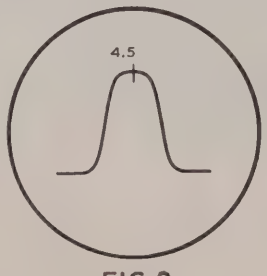

FIG. 2

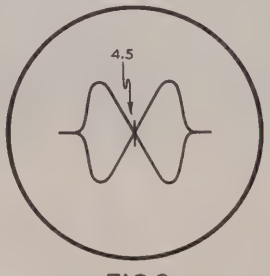

FIG. 3

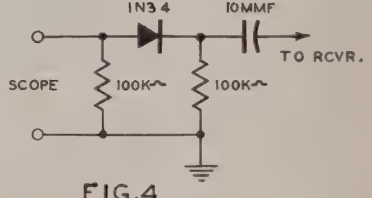

FIG. 4

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ALIGNMENT INSTRUCTIONS (cont)

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	15KΩ Carbon Resistor	High side to point (A). Low side to chassis.	Not used	4.5MC (400~Mod)	Any non-interfering channel	Vert. Amp. thru detector (Fig.4) to pin 2 of the picture tube. Low side to chassis.	A14	Set scope vert. gain to maximum. Adjust A14 for MINIMUM 400~ indication on scope.

ALTERNATE 4.5MC TRAP ALIGNMENT

Tune in the strongest TV station available and adjust A14 for MINIMUM 4.5MC beat interference in the picture with the fine tuning control in the center of its range.

OSCILLATOR ALIGNMENT

Connect the negative lead of a 1.5 volt bias battery to the white lead on top of the tuner. Connect the positive lead to chassis.
Remove the gate pulse plug from its socket.
Couple a 45.75MC (Unmod) output of a second signal generator to the 1st. video IF amplifier tube (V3) by removing the tube shield and attaching the output leads of the generator to the ends of a few turns of wire wrapped around the tube.
The output is set at 45.75MC throughout the entire oscillator alignment.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control at the middle of its range (with the cam stop opposite the channel 8 oscillator tuning core).

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	Not used	211.25MC	13	Vert. Amp. thru 15KΩ to point (A). Low side to chassis.	A15	Adjust for zero beat with 45.75MC IF signal as indicated on scope.
				205.25MC	12		A16	
				199.25MC	11		A17	
				193.25MC	10		A18	
				187.25MC	9		A19	
				181.25MC	8		A20	
				175.25MC	7		A21	
				83.25MC	6		A22	
				77.25MC	5		A23	
				67.25MC	4		A24	
				61.25MC	3		A25	
				55.25MC	2		A26	

RF AND MIXER ALIGNMENT

Leave the bias connected as under oscillator alignment.
Adjust the scope controls so that the width of the pattern is approximately double its height. Do not change width of pattern, but vary scope vertical gain as generator output is varied. Any change in waveshape indicates overload and generator output should be reduced. When comparing response curves from channel to channel the 2 to 1 width to height relationship should be maintained.
Remove the 1st. IF tube (V3) from its socket.
Disconnect the tuner coupling link at the IF terminal strip (near V3) and solder a 68Ω, ½ watt carbon resistor to the open end of the link.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	213MC 210MC 216MC	13	Vert. Amp. thru 100KΩ to point (E). Low side to chassis.	A27, A28	Use 210MC and 216MC markers to establish channel limits. Adjust A27 and A28 for symmetrical bandpass centered about 213MC. See Fig. 5.
16.	"	"	177MC (10MC Swp)	177MC 174MC 180MC	7	"	A29, A30	Use 174MC and 180MC markers to establish channel limits. Check for response as indicated by dotted line curves in Figs. 6A and 6B. If response is not symmetrical and centered about 177MC, adjust A29 and A30 until curve appears as in Fig.6B. This adjustment over compensates to allow for effect of channel 13 adjustment on channel 7. Repeat steps 15 and 16 as necessary to obtain most symmetrical and centered response curves on channels 13 and 7.
17.	"	"	85MC (10MC Swp)	85MC 82MC 88MC	6	"	A31, A32, A33	Use 82MC and 88MC markers to establish channel limits. Adjust A31 and A32 for symmetrical approximately centered bandpass. Detune A32 counter clockwise until a single peak appears. Adjust A31 until peak falls at 85MC. (If necessary, increase generator output). Adjust A33 for maximum curve height and symmetry. SLIGHTLY retouch A31 and A32 for symmetrical response similar to Fig. 5. Remove 68Ω resistor and resistors link connections. Replace V3.

UHF TUNER-ADAPTER ALIGNMENT

Alignment of this portion of the receiver is not recommended in the field. Should alignment or major repair become necessary the entire unit should be returned to the factory.
Tube replacement may detune the tuner. Should this occur, try a number of tubes until the most satisfactory substitute for the original is found.

VIDEO PEAKING COIL ADJUSTMENTS

In case of excessive overshoot or smear on some stations it may be necessary to adjust A34 and A35.
Alignment of the tuner and IF portions of the receiver must be correct before these adjustments are made. Counter clockwise adjustment will reduce the amount of overshoot and clockwise adjustment will reduce the amount of smear. Proper adjustment point is the point of minimum smear and trailing whites.

FIG.5

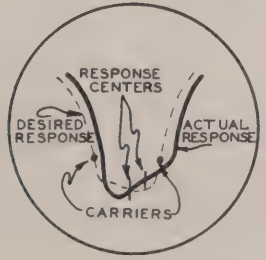


FIG.6A

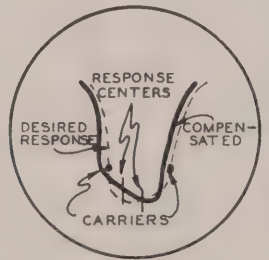
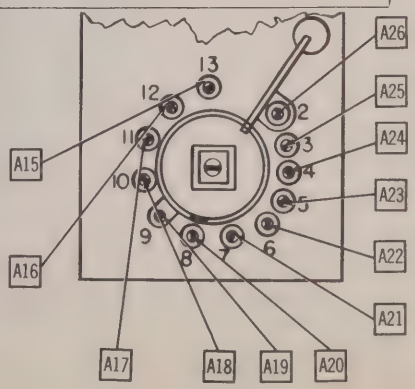


FIG.6B



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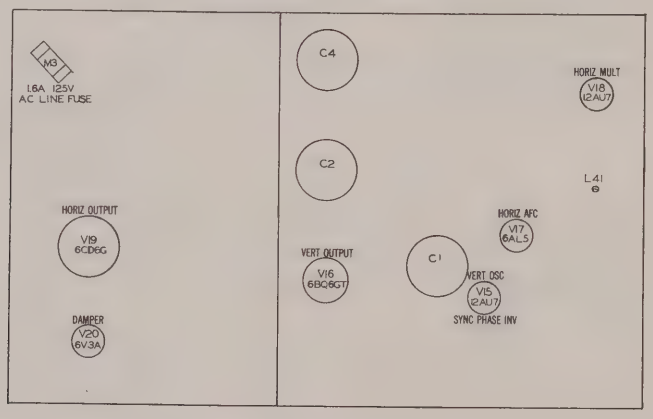
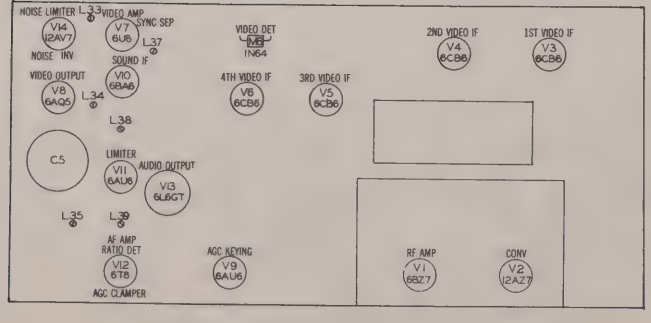
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BZ7	† 1KΩ	800KΩ	INF	0Ω	.1Ω	INF	600KΩ	0Ω	0Ω
V 2	12AZ7	† 16KΩ	100KΩ	0Ω	.1Ω	.1Ω	† 15KΩ	10KΩ	0Ω	0Ω
V 3	6CB6	110KΩ	68Ω	.1Ω	0Ω	† 2.4KΩ	† 2.4KΩ	0Ω		
V 4	6CB6	47KΩ	68Ω	.1Ω	0Ω	† 2.4KΩ	0Ω			
V 5	6CB6	.1Ω	150Ω	.1Ω	0Ω	† 8.6KΩ	† 8.6KΩ	0Ω		
V 6	6CB6	.1Ω	150Ω	.1Ω	0Ω	† 2.2KΩ	† 2.2KΩ	0Ω		
V 7	▮U▮	■ 50KΩ	3.3KΩ	■ 4.7KΩ	0Ω	.1Ω	■ 8KΩ	33Ω	0Ω	2.7Meg
V 8	6AQ5	700KΩ	125Ω	.1Ω	0Ω	† 2.5KΩ	† 0Ω	700KΩ		
V 9	6AU6	70KΩ	22KΩ	.1Ω	0Ω	180KΩ	† 10KΩ	22KΩ		
V 10	6BA6	550KΩ	22KΩ	.1Ω	0Ω	† 220Ω	† 220Ω	22KΩ		
V 11	6AU6	100KΩ	0Ω	.1Ω	0Ω	† 11.5KΩ	† 11.5KΩ	0Ω		
V 12	▮T8	INF	33KΩ	INF	.1Ω	0Ω	570KΩ	0Ω	2.2Meg	† 270KΩ
V 13	6L6GA	INF	.1Ω	† 585Ω	‡ 620Ω	270KΩ	0Ω	0Ω	180Ω	
V 14	12AU7	■ 22Meg	47KΩ	0Ω	0Ω	0Ω	■ 165KΩ	■ 22Meg	3.3KΩ	.1▮
V 15	12AU7	† 14KΩ	1 Meg	2.2KΩ	0Ω	0Ω	† 1.3Meg	270KΩ	0Ω	.1Ω
V 16	6BQ6GT	INF	0Ω	INF	† 13KΩ	3.2Meg	INF	.1Ω	0Ω	TOP CAP † 265Ω
V 17	6AL5	15KΩ	15KΩ	0Ω	.1Ω	4.8Meg	INF	4.8Meg		
V 18	12AU7	† 53KΩ	120KΩ	1.2KΩ	.1Ω	.1Ω	† 21KΩ	9.4Meg	1.2KΩ	0Ω
V 19	6CD6G	INF	0Ω	0Ω	20KΩ	500KΩ	47KΩ	.1Ω	† 11.5KΩ	TOP CAP ▲ 24Ω
V 20	6V3A	INF	† 2Ω	INF	.1Ω	0Ω	INF	† 2Ω	INF	† 2Ω TOP CAP 5 Meg
V 21	1B3GT	PINS 1-8 HAVE INF. RESISTANCE								TOP CAP ▲ INF
V 22	1B3GT	PINS 1-8 HAVE INF. RESISTANCE								TOP CAP ▲ 434Ω
V 23	24VP4	0Ω	470KΩ	PIN 10 ▲ 2.2Meg	PIN 11 † 210KΩ	PIN 12 .1Ω				

† MEASURED FROM OUTPUT OF M1.
▲ MEASURED FROM TOP CAP OF V20.
■ MEASURED FROM 125V LINE.



BOTTOM VIEW



TUBE PLACEMENT CHART

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SWEEP CHASSIS-BOTTOM VIEW-CAPACITOR IDENTIFICATION

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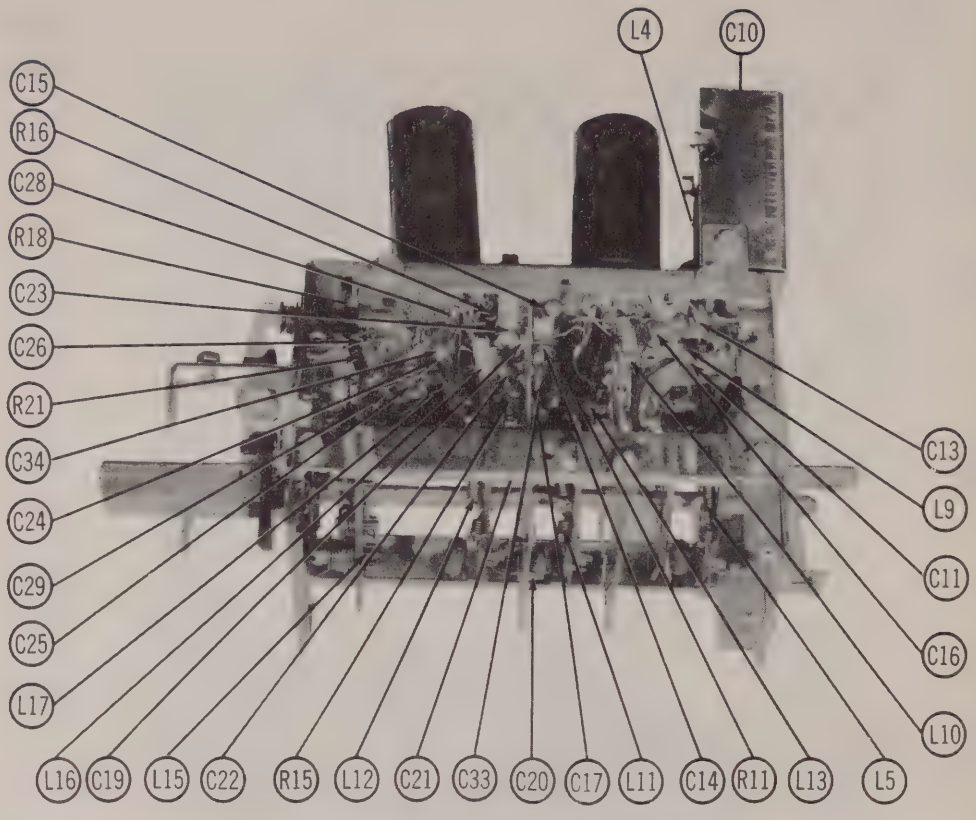
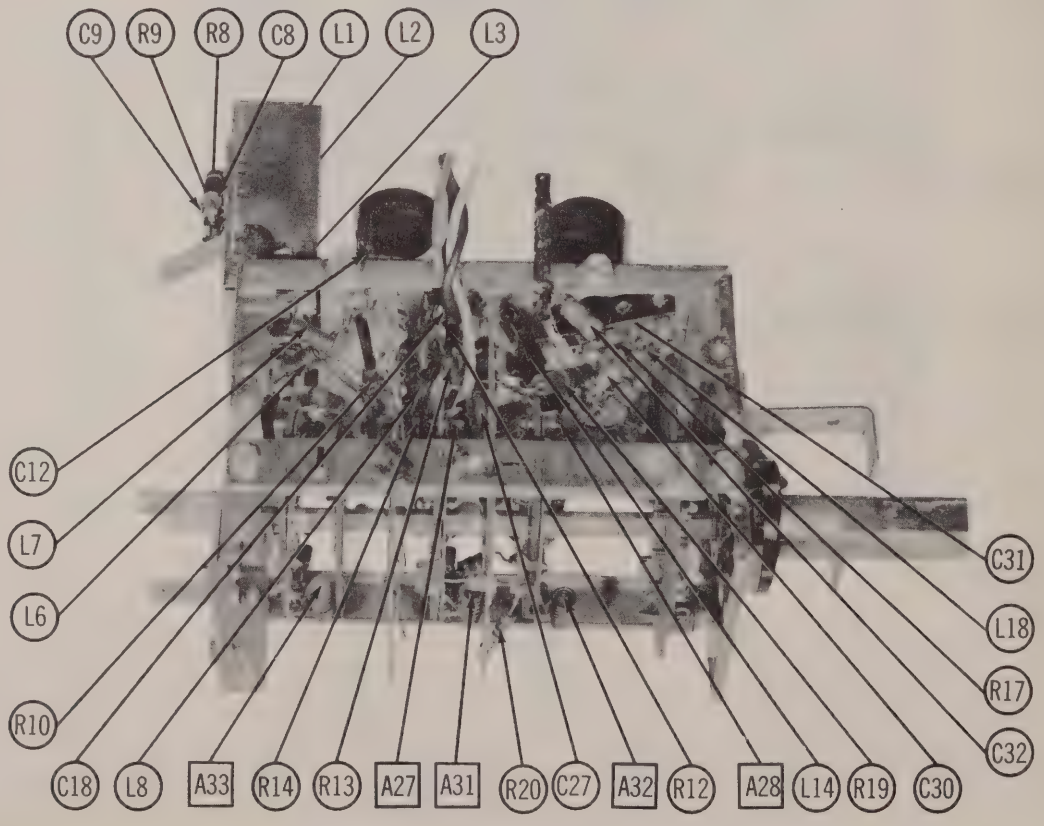


RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE

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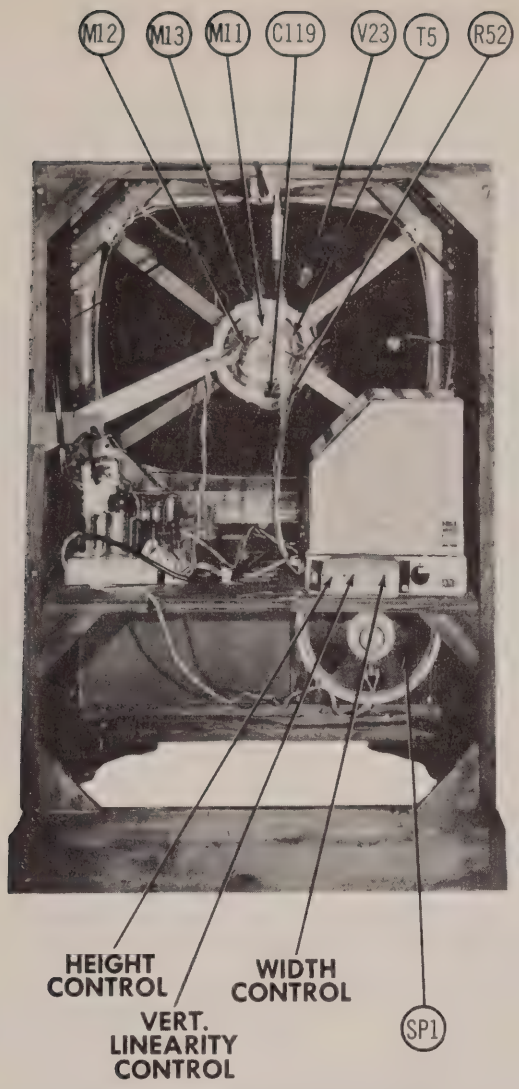

CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Reduce the picture width until approximately one inch of blank screen appears on each side of picture.

Increase the brightness control setting until the blanking bar becomes visible as indicated by a black bar at each side of the picture, Connect a .1MFD capacitor from chassis to the junction of R105 and C106. Set the horizontal hold control at the center of its range. Adjust the horizontal hold centering control until the picture is centered between the two blanking bars. Remove the .1MFD capacitor from chassis to ju nction of R105 and C106.

Adjust the horizontal ringing coil slug (B1) until the picture is again centered between the two blanking bars.

Rotate the horizontal hold control through its range.

The picture should lose sync at extremes of rotation. If it does not, readjust the horizontal hold centering control until that condition is obtained.

Check the number of diagonal bars on either side of the pull-in range of the horizontal hold control.

There should be 1 or 2 bars present.

If proper pull-in is not obtained, repeat the above procedure.

TROUBLE SHOOTING AIDS

CAUTION

When servicing this receiver, use a line isolation transformer, rated at least 225 watts, to remove shock hazzard and prevent damage to receiver and/or test equipment.

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss Of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V18, V19 and V20. Check adjustments of the width control. Check waveform W18.

If Satisfactory	If Unsatisfactory
Check T3, T5A, C111, C113, R125 and other associated circuit components.	Check C106, C107, C108, C109, C110, R118, R119, R123 and other associated components.

DRIVE LINES

Check by substitution V18, V19 and V20. Check C109, C110, R123, T3, T5A, C113 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V18, V19 and V20. Check components associated with the horizontal output and damper stages especially T3 and T5A.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V18, V19 and V20. Check C105 for open. Check T3, T5A and other associated circuit components.

XMAS TREE EFFECT

Substitute V18. Check C106, C107, C108, L41 and other associated circuit components for failure or change of value.

VERTICAL

LOSS OF SWEEP

Check by substitution V15 and V16. Check waveform W12.

If Satisfactory	If Unsatisfactory
Check T4, T5B, R106, R105 and other associated circuit components.	Check R104, R101, T2, C96 and other associated components.

INSUFFICIENT SWEEP

Check adjustment of height and vertical linearity controls. Proceed as outlined under "Loss Of Sweep".

COMPRESSED AT BOTTOM

Check by substitution V15 and V16. Check T4, T5B and other associated components for failure or change of value.

COMPRESSED AT TOP

Check by substitution V15 and V16. Check T2, C96, R104 and other associated components.

FOLDS

Check by substitution V15 and V16. Check associated circuit components for failure or change of value.

SYNC

LOSS OF HORIZONTAL AND VERTICAL SYNC

Check by substitution V7, V14 and V15. Check waveform W9.

If Satisfactory	If Unsatisfactory
Check components associated with V15A.	Check components associated with V14 and V7B.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Check by substitution V7, V14 and V15. Check waveform W10.

If Satisfactory	If Unsatisfactory
Check components associated with V15B.	Check vertical integrator network and other associated components.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Check by substitution V17 and V18. Check waveform W15.

If Satisfactory	If Unsatisfactory
Check components associated with V17 and V18 especially C106, C107 and C108.	Check C100, C101, R110, R111 and other associated components.

HORIZONTAL BENDING

Check by substitution V17, V18 and V19. Check horizontal AFC filter network components (C104, C105, R112, R114) for failure or change of value.

VIDEO

LOSS OF VIDEO

Check by substitution V7 and V8. Check picture tube and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best picture and sound. Adjust A14 for minimum beat. Check video IF alignment.

POOR CONTRAST

Check by substitution V7 and V8. Check video detector crystal and assembly. Check picture tube and other associated circuit components.

NEGATIVE PIX

Check by substitution V7, V8 and V9. Check AGC network. Check picture tube and other associated components.

SMEAR

Check by substitution V7 and V8. Check video detector crystal and assembly. Check C60, C62, R44, R45, R47, R50, L34, L35, L36, picture tube and other associated components for failure or change of value.

WIDE BLACK BAR ACROSS PIX

Check V1, V2, V3, V4, V5, V6, V7 and V8 for heater to cathode leakage. Check B+ filter capacitors for open.

AUDIO

WEAK OR NO SOUND

Check by substitution V10, V11, V12 and V13. Check stages V12B and V13 using audio signal generator. Apply audio signal across R73.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF alignment and components.	Check components associated with V12B and V13 especially C84.

BUZZ

Adjust tuner fine tuning for best picture and sound. Adjust A13 for minimum buzz. If still unsatisfactory substitute V12 and realign ratio detector and audio IF stages.

DISTORTED

Follow procedure outlined under "Weak Or No Sound".

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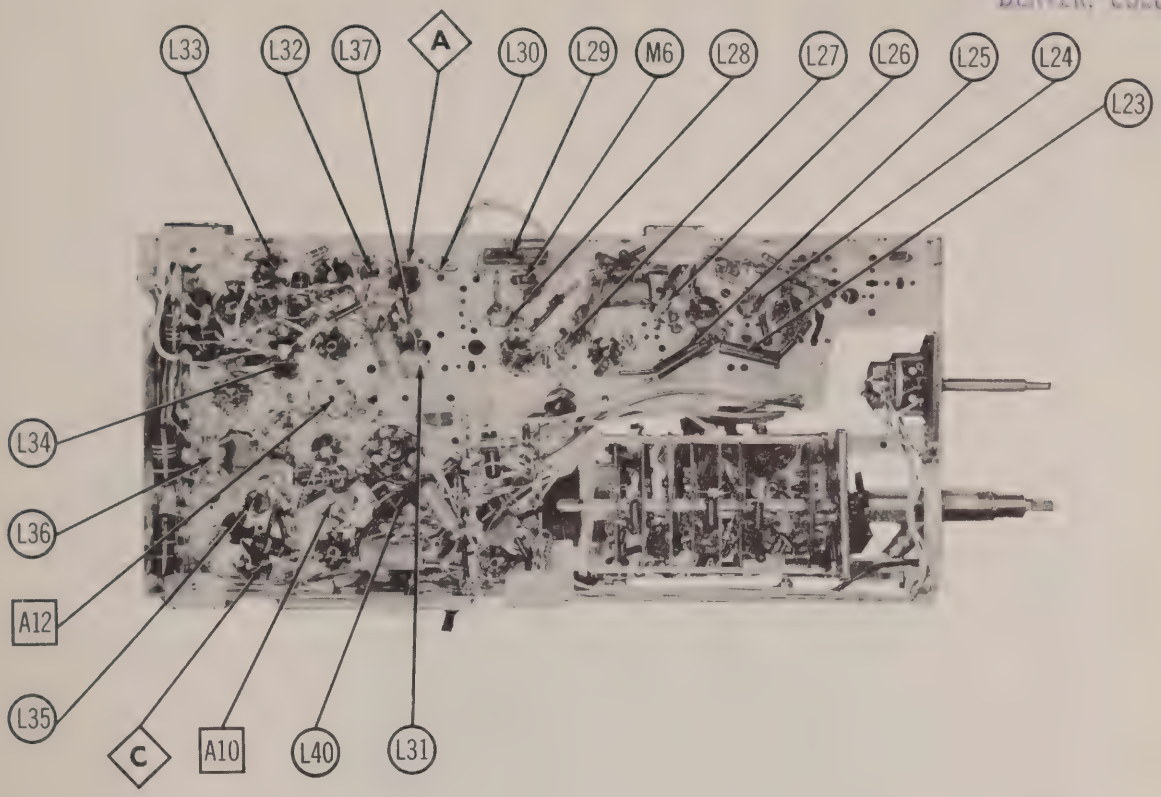
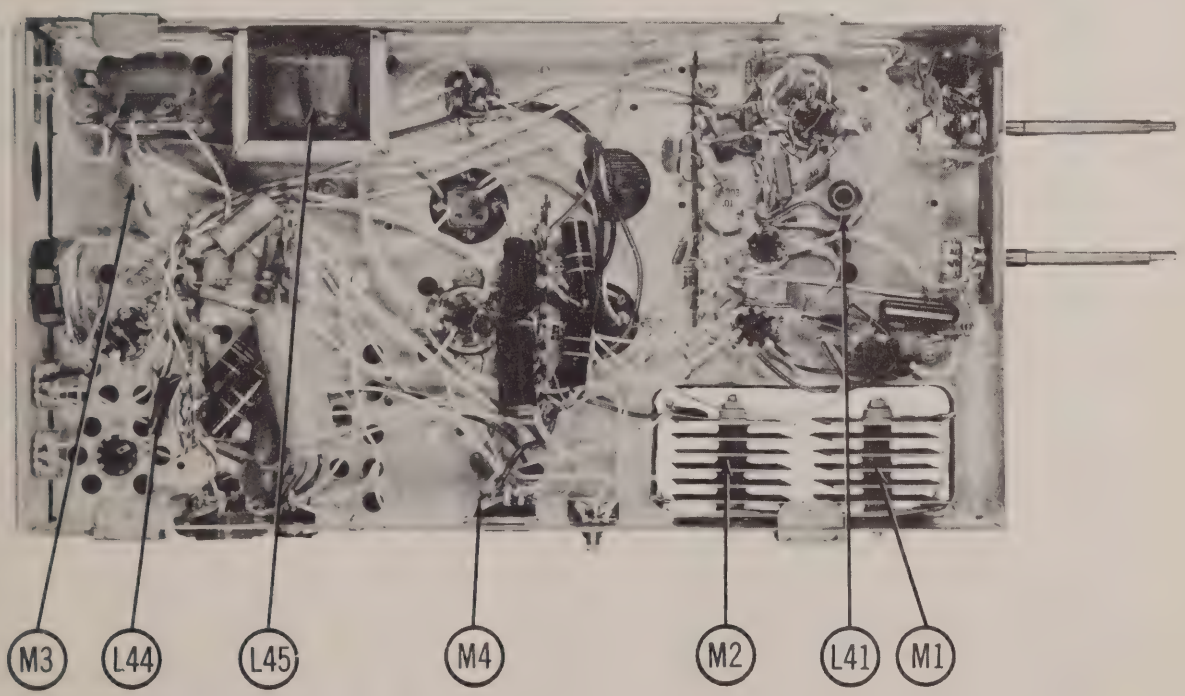
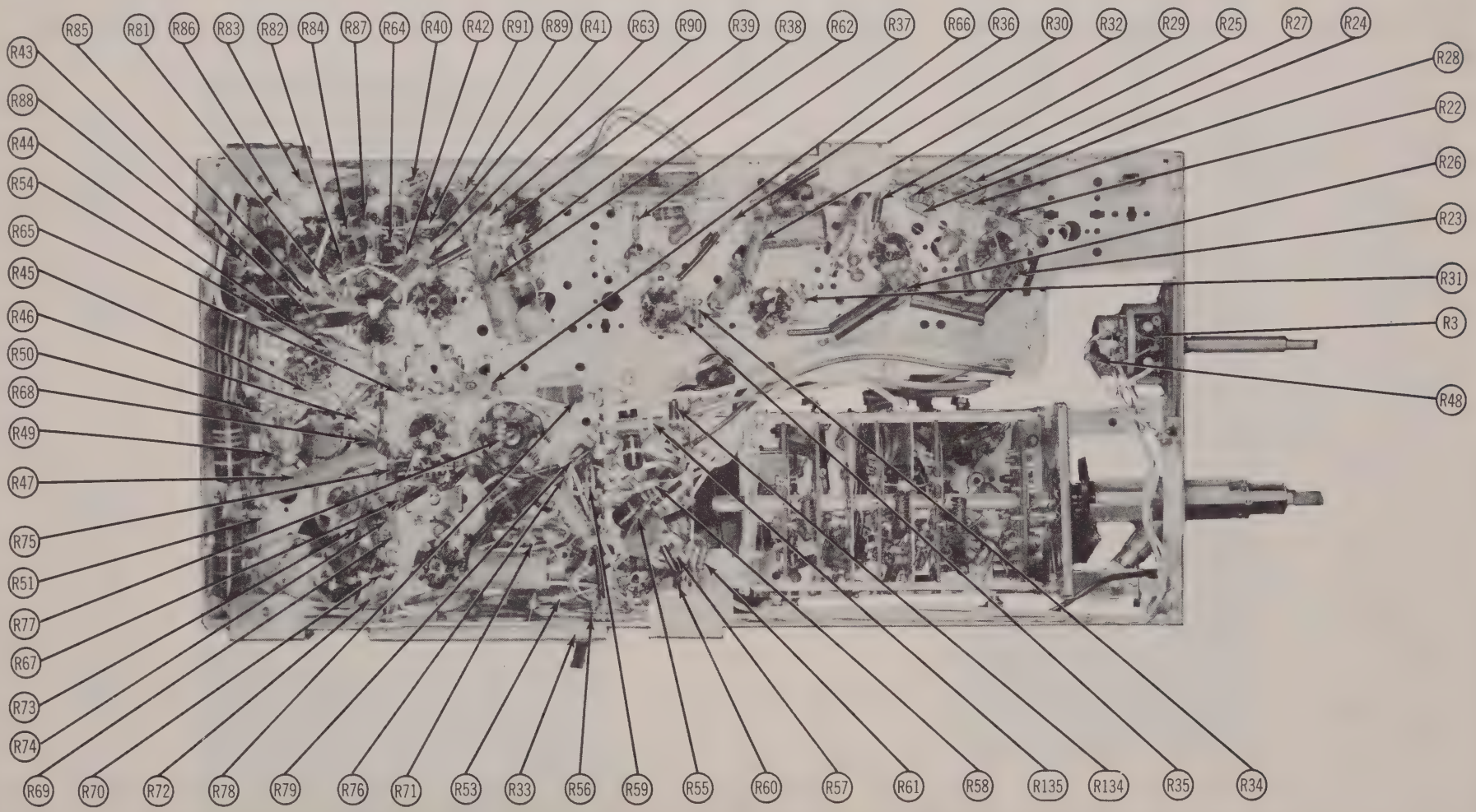
DENVER, COLORADO



RF-IF CHASSIS-BOTTOM VIEW- INDUCTOR AND ALIGNMENT IDENTIFICATION



SWEEP CHASSIS- BOTTOM VIEW- INDUCTOR IDENTIFICATION



RF-IF CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION

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DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BZ7	6BZ7	9AJ	
V2	Converter	12AZ7	12AZ7	9A	
V3	1st Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd Video IF Amp.	6CB6	6CB6	7CM	
V6	4th Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Amplifier - Sync Sync Separator	6U8	6U8	9AE	
V8	Video Output	6AQ5	6AQ5	7BZ	
V9	AGC Keying	6AU6	6AU6	7BK	
V10	Sound IF Amp.	6BA6	6BA6	7BK	
V11	Limiter	6AU6	6AU6	7BK	
V12	Ratio Detector - AGC Clamper - AF Amplifier	6T8	6T8	9E	
V13	Audio Output	6L6GT	6L6GT	7S	
V14	Noise Limiter - Noise Inverter	12AU7	12AU7	9A	
V15	Sync Phase Inv. - Vert. Oscillator	12AU7	12AU7	9A	
V16	Vert. Output	6BQ6GT	6BQ6GT	6AM	
V17	Horiz. AFC	6AL5	6AL5	6BT	
V18	Horiz. Mult	12AU7	12AU7	9A	
V19	Horiz. Output	6CD6G	6CD6G	5BT	
V20	Damper	6V3A	6V3A	9BD	
V21	HV Rectifier	1B3GT	1B3GT	3C	
V22	HV Rectifier	1B3GT	1B3GT	3C	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: PHILCO PART No.	SYLVANIA PART No.	GENERAL ELECTRIC PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V23	24VP4A	24VP4A			12N	
		24VP4			12N	
				24CP4	12N	
			24CP4A	24CP4A	12N	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1	120	150	30-2568-51	AFHS1-73		XA007		FP140	TVL-1428	
C2	120	150	30-2568-51	AFHS1-73		XA007		FP140	TVL-1428	
C3	10	25	30-2417-8	E26E117		BR102		TC22	TVA-1204	
C4A	■100	300	30-2584-7	AFH4-110		D116			TVL-4704	
B	▲20	300		PRS250/20						
C	▲10	450								
D	20	200								
C5A	■40	300	30-2584-24	AFH4-18		D112		FP428	TVL-4583	
B	10	300		PRS450/40				TC77		
C	▲60	300								
D	▲10	300								
C6	2	50	30-2417-7	E26E6		BBR2-50T		TC302	TVA-1301	
C7	2	50	30-2417-7	E26E6		BBR2-50T		TC302	TVA-1301	
C8	470		30-1225-18	SI470	D6-471		GP2K-471	UC-5347	5GA-T47	
C9	470		30-1225-18	SI470	D6-471		GP2K-471	UC-5347	5GA-T47	
C10	20		62-02030911	SI20NP0	TCZ-20		NP0K-200	ZT-542	5TCC-Q2	
C11	39		62-03940911	SI39	D6-390		GP1K-390	UC-5439	5GA-Q39	
C12	1000		30-1245-1	EF-001	MFT-1000				503C-D1	
C13	220		62-122001001	SI220	D6-221		GP2K-221	UC-5322	5GA-T22	
C14	.5-3		31-6520-3		829-3		3115-01-0R5	CT565A		
C15	680		62-168001001	SI680	D6-681		GP2K-681	UC-5368	5GA-T68	
C16	220		62-122001001	SI220	D6-221		GP2K-221	UC-5322	5GA-T22	
C17	150		62-115001001	BPD-00015	D6-151	TM5T15	811-151	UC-5315	5GA-T15	
C18	10000		30-1238-2	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C19	.6		311-5050-3							
C20	1.45									
C21	3									
C22	39		62-03940911	SI39	D6-390		GP1K-390	UC-5439	5GA-Q39	
C23	.5-3		31-6520-3		829-3		3115-01-0R5	CT565A		
C24	1.5		30-1221-7							
C25	12		62-012300001							
C26	5		30-1224-5	SI5N750	TCN-5		N750K-050		5TCUB-V5	
C27	1000		30-1245-1	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C28	220		62-122001001	SI220	D6-221		GP2K-221	UC-5322	5GA-T22	
C29	7.5		30-1224-13							
C30	1-5		31-6520-11		829-6		3139-01-10			
C31	680		62-168001001	SI680	D6-681		GP2K-681	UC-5368	5GA-T68	
C32	680		62-168001001	SI680	D6-681		GP2K-681	UC-5368	5GA-T68	
C33	1000		30-1245-1	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C34	220		62-122001001	SI220	D6-221		GP2K-221	UC-5322	5GA-T22	
C35	5			SI5NP0	TCZ-4.7		NP0K-050	ZT-555	5TCCB-V47	
C36	1-5				829-6		3139-01-10			
C37	5			SI5NP0	TCZ-4.7		NP0K-050	ZT-555	5TCCB-V47	
C38	1-5				829-6		3139-01-10			
C39	1-5				829-6		3139-01-10			
C40	100			SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C41	680			SI680	D6-681		GP2K-681	UC-5368	5GA-T68	
C42	1500			SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C43	18			SI18	D6-180		GP1K-180	UC-5418	5GA-Q18	
C44	1-5				829-6		3139-01-10			
C45	680			SI680	D6-681		GP2K-681	UC-5368	5GA-T68	
C46	680			SI680	D6-681		GP2K-681	UC-5368	5GA-T68	
C47	680			SI680	D6-681		GP2K-681	UC-5368	5GA-T68	
C48	1-5				829-6		3139-01-10			
C49	2000			SI2000	D6-202	TM5D2	GP2K-202	UC-522	5HK-D2	
C50	2000			SI2000	D6-202	TM5D 2	GP2K-202	UC-522	5HK-D2	

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PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C81	1-8				839-8		3139-01-10			
C82	6&0			81680	D6-681		GP2E-681	UC-5368	5GA-T68	
C83	1000			813000	D6-302	TM5D2	GP2E-302	UC-533	5HK-D2	
C84	3000			833000	D6-302	TM5D2	GP2E-302	UC-533	5HK-D2	
C85	1-8				839-8		3139-01-10			
C86	18			8118	D6-180		GP1K-100	UC-541	5GA-Q1	
C87	.015	200								
C88	68			8168	D6-680		GP1K-680	UC-5468	5GA-Q68	
C89	33			8133	D6-330		GP1K-330	UC-5433	5GA-Q33	
C90	.047	200		P288-047	DF-503	PTE4847		PT4147	3TM-S47	
C91	220	500								
C92	.047	400		P488-047	DF-503	PTE4847		PT4147	4TM-S47	
C93	.1	200		P288-1	DF-104	PJ2P1		PT401	3TM-P1	
C94	.047	200		P288-047	DF-503	PTE4847		PT4147	3TM-S47	
C95	.01	400		P488-01	D6-103	PTE481	GP2-333-103	PT411	4TM-S1	
C96	360			83680	D6-681		GP2E-681	UC-5368	5GA-T68	
C97	3.3			813.3NP0	TCZ-3.3		NP0K-3R3		5TCCB-Y22	
C98	18			81N8NP0	TCZ-18		N8OK-1R8		5TCC-Q18	
C99	1500			81500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C70	.0015	400		P488-0015	D6-152	PTE6D15	GP2L-152	PT6215	6TM-D15	
C71	.047	400		P488-047	DF-503	PTE4847		PT4147	4TM-S47	
C72	94									
C73	.0022	400		P488-0022	D6-222	PTE6D22	GP2-333-222	PT6222	6TM-D22	
C74	330			8330	D6-331		GP2K-331	UC-5333	5GA-T33	
C75	330			8330	D6-331		GP2K-331	UC-5333	5GA-T33	
C76	1500			81500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C77	.0022	400		P488-0022	D6-222	PTE6D22	GP2-333-222	PT6222	6TM-D22	
C78	10000			BPD-01	DD-103	TM5B1	81L-01	DC-511	5HK-S1	
C79	5000			BPD-005	DD-502	TM5D5	81L-005	DC-525	5HK-D5	
C80	10000			BPD-01	DD-103	TM5B1	81L-01	DC-511	5HK-S1	Note 1
C81	.01	400		P488-01	D6-103	PTE4B1	GP2-333-103	PT411	4TM-S1	
C82	1500			81500	D6-152	TM5D15	GP2L-153	UC-5315	5HK-D15	
C83	.0047	600		P688-0047	D6-472	PTE6D47	GP3-333-472	PT6247	6TM-D47	
C84	.01	400		P488-01	D6-103	PTE4B1	GP2-333-103	PT411	4TM-S1	
C85	.0033	1000		P1088-0033		PTE10D33		PT10533	8TM-E33	
C86	10000			BPD-01	DD-103	TM5B1	81L-01	DC-511	5HK-S1	
C87	.01	400		P488-01	D6-103	PTE4B1	GP2-333-103	PT411	4TM-S1	
C88	.1	200		P288-1	DF-104	PJ2P1		PT401	3TM-P1	
C89	.0047	600		P688-0047	D6-472	PTE6D47	GP3-333-472	PT6247	6TM-D47	
C90	470			81470	D6-471		GP2K-471	UC-5347	5GA-T47	
C91	.047	400	30-4668-45	P488-047	DF-503	PTE4847		PT4147	4TM-S47	
C92	.01	400	30-4668-41	P488-01	D6-103	PTE4B1	GP2-333-103	PT411	4TM-S1	
C93	.0022	600	30-4668-37	P688-0022	D6-222	PTE6D22	GP3-333-222	PT6222	6TM-D22	
C94	.0033	200	30-4668-27	P288-0033				PT4133		
C95	.1	400		P488-1		PTE4P1		PT401	4TM-P1	
C96	.1	400		P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C97	.1	200	30-4668-30	P288-1	DF-104	PJ2P1		PT401	3TM-P1	
C98	.01	400	30-4671-44	P488-01	D6-103	PTE4B1		PT411	4TM-S1	
C99	.1	400		P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C100	5000			BPD-005	DD-502	TM5D5	81L-001	DC-525	5HK-D5	
C101	1000			BPD-001	DD-102	TM5D1	81L-001	DC-521	5HK-D1	
C102	10000			BPD-01	DD-103	TM5B1	81L-01	DC-511	5HK-S1	
C103	10000			BPD-01	DD-103	TM5B1	81L-01	DC-511	5HK-S1	
C104	500			BPD-002	DD-202	TM5D2	81L-002	DC-522	5HK-D2	
C105	10000			BPD-01	DD-103	TM5B1	81L-01	DC-511	5HK-S1	
C106	500	500								
C107	82	500								
C108	300	500		1469-0004		GR5T4		MC8343	MS-34	
C109	370	500		1469-0003		GR5T3		RE-E341	MS-33	
C110	5000			BPD-005	DD-502	TM5D5	81L-005	DC-525	5HK-D5	
C111	.047	400		P488-047	DF-503	PTE4847		PT4147	4TM-S47	
C112	1000			BPD-01	DD-103	TM5B1		DC-511	5HK-S1	
C113	.033	200		P288-033				PT4133		
C114	.47	200	30-4671-68	884-5		PJ6P5		PT6047	6TM-P5	
C115	82	5000								Note 2
C116	82	5000								
C117	500	20000		HV20C	TV3-502	MMC-20T5	413		HV20035A	20DK-T5
C118	500	20000		HV20C	TV3-502	MMC-20T5	413		HV20035A	20DK-T5
C119	.01	600		P688-01		PTE6B1			PT611	6TM-S1

Note 1. Value may vary from .01MFD to .05MFD. Replace with original value.
Note 2. Some Models may use 68MMF in this application.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	10 Meg		33-5563-56	♦ QJ-438	RTV-429			Tone - Panel
B	3 Meg		Not Req.					Volume and switch-Shipped at 1.2 Meg - rear
R2A	80&0		33-5563-57	■ QJ-439	RTV-430			Horiz. Hold - Panel
B	250&0		Not Req.					Vert. Hold - Rear
R3A	250&0	2	33-5563-51	♦ QJ-357	RTV-359		WF252 UM15L	Contrast - Panel wire wound
B	100&0		Not Req.					Brightness - Rear
R4A	2.5Meg		33-5563-32	QU-239	AG-84-8	AB-83	U-355	Height
B	Shaft		Not Req.	RQ	FK8-1/4	AK-1	Not Req.	Attach to R4A.
R5A	5 Meg		33-5565-31	QU-141	AG-85-8	AB-87	SU-67	Vert. Linearity
B	Shaft		Not Req.	RQ	FK8-1/4	AK-1	Not Req.	Attach to R5A
R6A	10&0	4	33-5546-18	4WK-10000	A10-10K	VK-137	A10M2	Width
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R6A
R7A	250&0		33-5565-17	QU-130	AG-85-8	AB-80	SU-46	Horiz. Freq. Control
B	Shaft		Not Req.	RQ	FK8-1/4	AK-1	Not Req.	Attach to R7A

♦ CONCENTRIKIT EQUIVALENT KIT K-3 BASE ELEMENTS AND SHAFTS W17-111 and P3-131 (Panel) B11-128 AND R1-216 (Rear).
♦ CONCENTRIKIT EQUIVALENT KIT K-3 BASE ELEMENTS AND SHAFTS B12-141 AND P1-300 (Panel) B18-139X AND R1-316 (Rear) AND SWITCH 76-1.
■ CONCENTRIKIT EQUIVALENT KIT K-2 BASE ELEMENTS AND SHAFTS B11-123 AND P1-300 (Panel) B11-130 AND R1-316 (Rear).

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	PHILCO PART No.	IRC PART No.	NOTES
R8	1 Meg	½		BT8-1 Meg	
R9	1 Meg	½		BT8-1 Meg	
R10	10K Ω	½		BT8-10K	
R11	1000 Ω	1		BT8-1000	
R12	1.5 Meg 5%	½		BT8-1.5Meg 5%	
R13	1.5 Meg 5%	½		BT8-1.5Meg 5%	
R14	1000 Ω	½		BT8-1000	
R15	820 Ω	½		BT8-820	
R16	100K Ω	½		BT8-100K	
R17	1000 Ω	½		BT8-1000	
R18	10K Ω	½		BT8-10K	
R19	1.5K Ω	1		BT8-1.5K	
R20	4700 Ω	½		BT8-4700	
R21	10 Ω	½		BT8-10	
R22	15K Ω	½		BT8-15K	
R23	68 Ω	½		BT8-68	
R24	220 Ω	½		BT8-220	
R25	47K Ω	½		BT8-47K	
R26	68 Ω	½		BT8-68	
R27	47K Ω	½		BT8-47K	
R28	47K Ω	½		BT8-47K	
R29	220 Ω	½		BT8-220	
R30	220 Ω	½		BT8-220	
R31	150 Ω	½		BT8-150	
R32	5800 Ω	1	66-3564340	BTA-5800	
R33A	3000 Ω	7	33-3446-8		
B	4700 Ω	2.6			
R34	15K Ω	½		BT8-15K	
R35	150 Ω	½		BT8-150	
R36	220 Ω	½		BT8-220	
R37	12K Ω	½		BT8-12K	
R38	3300 Ω	½		BT8-3300	
R39	6800 Ω	½		BT8-6800	
R40	33 Ω	½		BT8-33	
R41	47K Ω	½		BT8-47K	
R43	4700 Ω	½		BT8-4700	
R43	3300 Ω	½		BT8-3300	
R44	4700 Ω	½		BT8-4700	
R45	1.5 Meg	½		BT8-1.5Meg	
R46	1 Meg	½		BT8-1 Meg	
R47	3500 Ω	7	33-1335-93		
R48	22K Ω	½		BT8-22K	
R49	3300 Ω	½		BT8-3300	
R50	470K Ω	½		BT8-470K	
R51	180K Ω 5%	½		BT8-180K 5%	
R52	470K Ω	1	66-4474340	BTA-470K	
R53	560K Ω	½		BT8-560K	
R54	47K Ω	½		BT8-47K	
R55	5.6Meg	½		BT8-5.6Meg	
R56	10K Ω	½		BT8-10K	
R57	47K Ω	½		BT8-47K	
R58	470K Ω	½		BT8-470K	
R59	10K Ω	½		BT8-10K	
R60	3300 Ω	½		BT8-3300	
R61	2200 Ω	½		BT8-2200	
R62	1 Meg	½		BT8-1 Meg	
R63	1 Meg	½		BT8-1 Meg	
R64	100 Ω	½		BT8-100	
R65	220 Ω	½		BT8-220	
R66	470K Ω	½		BT8-100K	
R67	22K Ω	½		BT8-22K	
R68	12K Ω	1	66-3124346	BTA-12K	
R69	270 Ω	½		BT8-270	
R70	22K Ω	½		BT8-22K	

Note . Not used in all models.

ITEM No.	RATING OHMS	RATING WATT	PHILCO PART No.	IRC PART No.	NOTES
R71	33K Ω	½		BT8-33K	
R72	15K Ω	½		BT8-15K	
R73	2.2Meg	½		BT8-2.2Meg	
R74	82K Ω	½		BT8-82K	
R75	1 Meg	½		BT8-1 Meg	
R76	270K Ω	½		BT8-270K	
R77	270K Ω	½		BT8-270K	
R78	180 Ω	3	66-1185340		
R79	220 Ω	½		BT8-220	
R80	68K Ω	½		BT8-68K	
R81	47K Ω	½		BT8-47K	
R82	22 Meg	½		BT8-22Meg	
R83	3300 Ω	½		BT8-3300	
R84	47K Ω	½		BT8-47K	
R85	33K Ω	½		BT8-33K	
R86	220K Ω	½		BT8-220K	
R87	470K Ω	½		BT8-470K	
R88	68K Ω	½		BT8-68K	
R89	2.7Meg	½		BT8-2.7Meg	
R90	47K Ω	½		BT8-47K	
R91	150K Ω	½		BT8-150K	
R92	1 Meg	½		BT8-1 Meg	
R93	3900 Ω	½		BT8-3900	
R94	2200 Ω	½		BT8-2200	
R95	10K Ω	½		BT8-10K	
R96	22K Ω	½		BT8-22K	
R97	4700 Ω	½		BT8-4700	
R98	120K Ω	½		BT8-120K	
R99	68K Ω	½		BT8-68K	
R100	68K Ω	½		BT8-68K	
R101	470K Ω	½		BT8-470K	
R102	680 Ω	½		BT8-680	Note
R103	2.2Meg	½		BT8-2.2Meg	
R104	1 Meg	2		BT8-1Meg	
R105	22K Ω	3	66-3225340	BTB-22K	
R106	18K Ω	3	66-3185340	BTB-18K	
R107	680 Ω	1		BTA-680	
R108	1000 Ω	½		BT8-1000	
R109	1000 Ω	½		BT8-1000	
R110	100K Ω	½		BT8-100K	
R111	100K Ω	½		BT8-100K	
R112	4.7Meg	½		BT8-4.7Meg	
R113	15K Ω	½		BT8-15K	
R114	4.7Meg	½		BT8-4.7Meg	
R115	1200 Ω	½		BT8-1200	
R116	18K Ω	½		BT8-18K	
R117	56K Ω	½		BT8-56K	
R118	47K Ω	½		BT8-47K	
R119	5600 Ω	½		BT8-5600	
R120	10K Ω	½		BT8-10K	
R121	47K Ω	1	66-3474340	BTA-47K	
R122	1 Meg 5%	½		BT8-1 Meg 5%	
R123	470K Ω	½		BT8-470K	
R124	10K Ω	½		BT8-10K	
R125	5000 Ω	7	33-1335-95	3/4A-5000	
R126	2.2Meg	½		BT8-2.2Meg	
R127	3.3Meg	½		BT8-3.3Meg	
R128	47K Ω	½		BT8-47K	
R129	1.5Meg	½	33-1352-2	BT8-1.5Meg	
R130	1.5Meg	½	33-1352-2	BT8-1.5Meg	
R131	1.5Meg	½	33-1352-2	BT8-1.5Meg	
R132	5Ω	20	33-3448-18	ZD-5	
R133	47K Ω	½		BT8-47K	
R134	10Ω	½	66-0108340	BT8-10	
R135	16K Ω	1		BTA-15K	

TRANSFORMER (FILAMENT)

ITEM No.	RATING PRI.	RATING SEC 1	RATING SEC 2	PHILCO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordorson PART No.
T1	117VAC	6.3VAC	6.3VAC	32-8835			F-36A①			
	①.8A	②6.3A	② 6.1A				②			

① Drill one new mounting hole.
② Parallel two 6.3V windings for each section.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	PHILCO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.
T2	Vert. Osc. Trans.	32-8431-9	A-8126①				
T3	Horiz. Output Trans.	32-8634 ②					
T4	Vert. Output Trans.	32-8837					
T5A	Yoke (90°) Horiz. (30MH)	32-9663					
B	Yoke Vert. (42MH)						

① Drill one new mounting hole.
② Includes coils L43 and L43.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	PHILCO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordorson PART No.	NOTES
T6	2.7KΩ	3.2Ω	32-8579	A-3825①	A3018	S-1X ①	Z1006	T2-24861	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	PHILCO PART No	VIKING PART No	QUAM PART No.	NOTES
SP1	10"	PM	3.2Ω	36-1610-6 36-1610-9 ①	10J11	10A4A	① Alternate 10" PM speaker.

COILS (RF-IF)

ITEM No.	USE	DC RES PRI.	DC RES SEC.	PHILCO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Trans.	.6Ω	.6Ω	32-4432-3				
L2	Ant. Trans.	.6Ω	.6Ω					
L3	IF Trap	0Ω		32-4552-1				Wound on 22MMF Cap.
L4	FM Trap	0Ω						
L5	Ant. Coils	0Ω		76-7610				Includes wafer switch
L6	UHF IF Coil	0Ω		312-5146-16				
L7	UHF IF Coil	0Ω		312-5146-19				
L8	Fil. Choke	0Ω		32-4550-1				
L9	IF Trap	.3Ω		32-4548-13				
L10	Neutr.Coil	0Ω		312-5146-20				
L11	RF Coils	0Ω		76-7608				Includes wafer switch
L12	Mixer Grid Coils	0Ω		76-7606				Includes wafer switch
L13	Mixer Grid Coil	0Ω						Wound on 820Ω resistor
L14	Fil. Choke	0Ω		32-4550-1				
L15	Osc.Coils	0Ω		76-7604				Includes wafer switch
L16	Feedback Coil	.9Ω		32-4551-1				
L17	RF Choke	0Ω		312-5146-8				
L18	RF Choke	.2Ω		32-5151-8				Wound on 12KΩ resistor
L19	IF Coupling	0Ω	0Ω	32-4599-2	17-4534 †			
L20	47.25MC Trap	.1Ω		32-4597-2			4604	1.2 Microhenries
L21	41.25MC Trap	.7Ω		32-4112-31			4604	1.62 Microhenries
L22	IF Coupling	.1Ω		32-4597-3				
L23	Fil. Choke	.1Ω		32-4112-15	19-3001	TV-189	4606	2.9 Microhenries
L24	1st. Video IF	.1Ω	.1Ω	32-4598-5	20-1045		6219	
L25	Fil. Choke	.1Ω		32-4112-15	19-3001	TV-189	4606	2.9 Microhenries
L26	2nd. Video IF	.1Ω	.1Ω	32-4598-3	17-4523		6219	
L27	3rd. Video IF	.1Ω	.1Ω	32-4546-26	17-4523		6219	
L28	4th. Video IF	.1Ω	.1Ω	32-4548-27	17-4523		6219	
L29	Series Peaking Coil	8.2Ω		32-4432-27			4612	10 Microhenries, IRC part CL-1
L30	Series Peaking Coil	.4Ω		32-4480-17			4606	3 Microhenries
L31	Shunt Peaking Coil	4.6Ω		32-4480-9	19-3180	TV-184	6180	
L32	Series Peaking Coil	6Ω		32-4480-18	19-3160	TV-184	4644	150 Microhenries
L33	4.5MC Trap	1.7Ω		32-4483-2	20-10004	TV-151	1470	
L34	Variable Shunt Peaking Coil	6.5Ω		32-4467-20				60-230 Microhenries
L35	Variable Shunt Peaking Coil	6.5Ω		32-4467-20				60-230 Microhenries
L36	Series Peaking Coil	2Ω		32-4480-1	19-3036	TV-180	6176	85 Microhenries
L37	2nd. Sound IF	4.2Ω		32-4483-9	17-3400	TV-151	1469	
L38	2nd. Sound IF	1.9Ω	1.9Ω	32-4497A	16-3445	TV-113	6203	
L39	Ratio Det.	5Ω	.85CT	32-4450-6A	17-3497	TV-115	6205	Tertiary winding-.8Ω
L40	Fil. Choke	.1Ω		32-4112-15	19-3001	TV-189	4606	2.9 Microhenries
L41	Horiz.Osc.	165Ω		32-4557	19-1576	TV-163	6310	
L42	RF Choke	2.1Ω					4624	Part of T3, 14.7 Microhenries
L43	RF Choke	2.1Ω					4624	Part of T3, 14.7 Microhenries
L44	RF Choke	1.8Ω		32-4112-24			4608	4 Microhenries

† Drill mounting hole.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE @ CURRENT 1000 ^c/_s	PHILCO PART No	Stancor PART No	Merit PART No.	Triad PART No	Halldorson PART No.	Thordorson PART No.
L45	.380A	44Ω	1.87 Hy.	32-8600-1					

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	PHILCO PART No.	SELETRON PART No.	FEDERAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	NOTES
M1	.380	34-8003-8	663	1021A	65450	500	
M2	.380	34-8003-8	663	1021A	65450	500	

FUSES

ITEM No.	TYPE	RATING	PHILCO PART No. FUSE	PHILCO PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M3	3AG 8/B P/T	1.6A 125V	AD-8348-19		31501.6 (3AG 3/B P/T 1.6A)		MDV 1 6/10	

M4 Piece of #26 wire 1" long mounted on interchassis socket -pins 1 to 7.

PHILCO MODELS 24B6106, L, 24BU6106, L, 24B6300 (Ch. D-208, R-207)

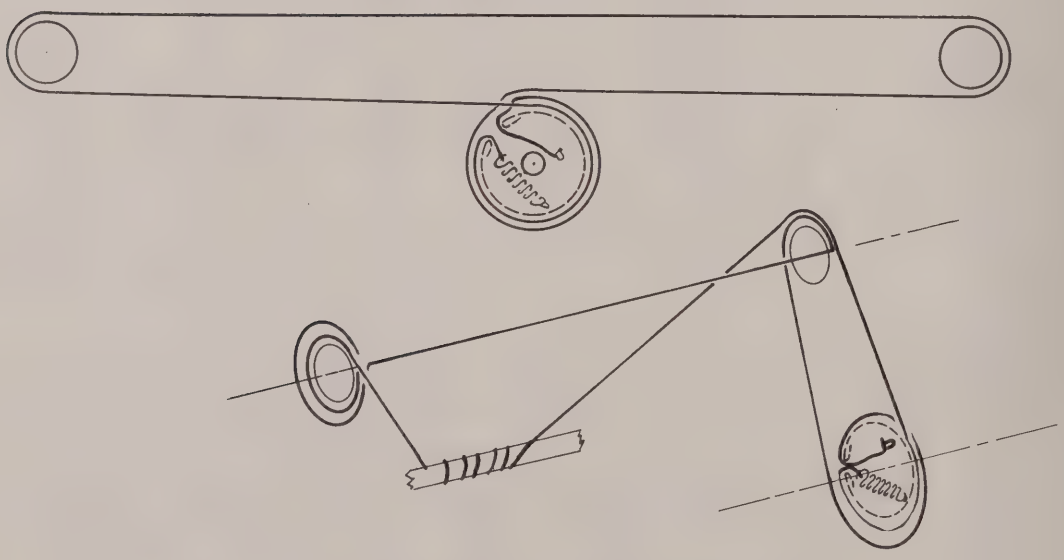
PARTS LIST AND DESCRIPTIONS (Continued)

CRYSTAL DIODES

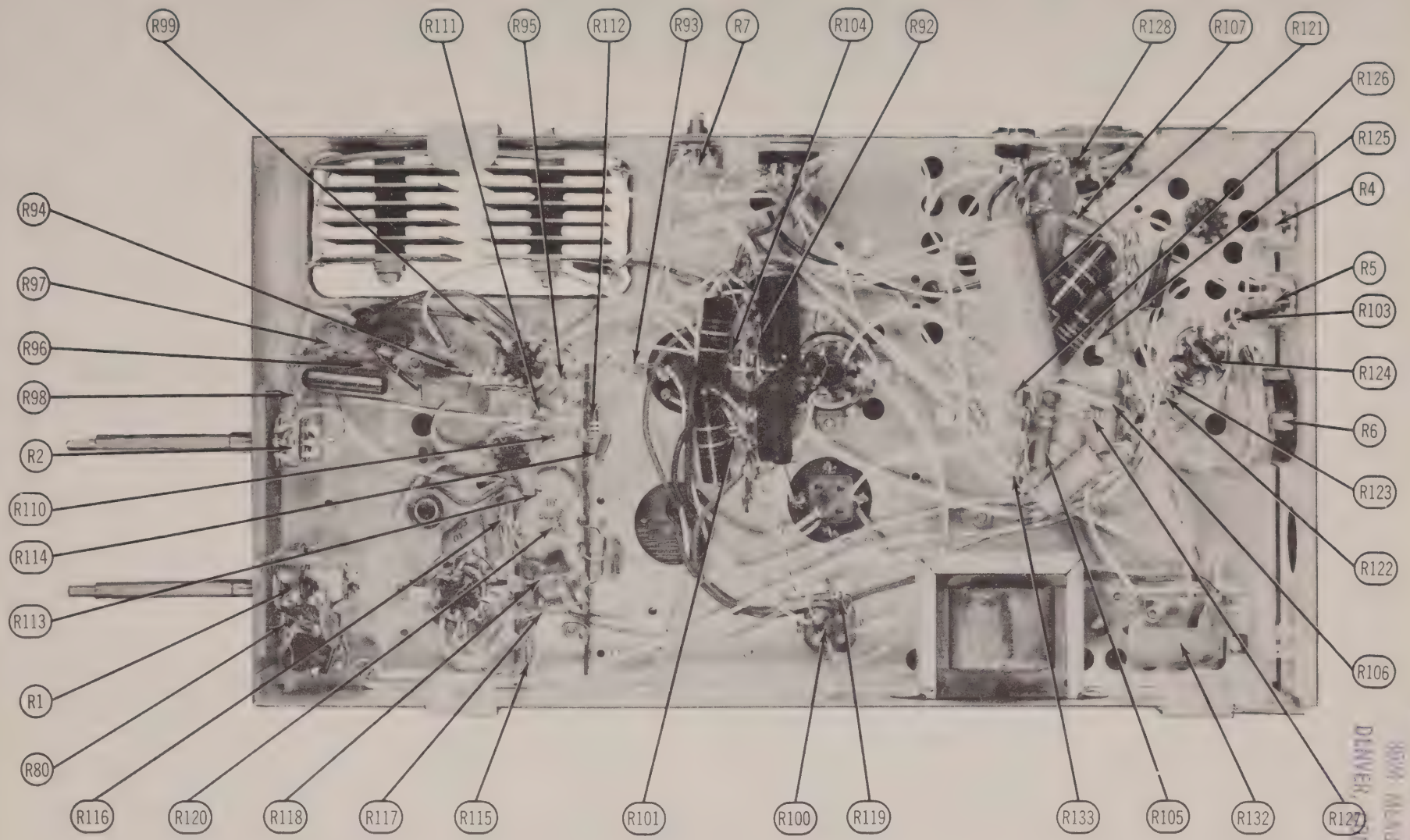
ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		PHILCO PART No.	SYLVANIA PART No.		
M5		34-8026	1N82 or "A"		UHF Mixer (Clip-in)
M6	1N64	34-8022	1N132		Video Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M7	Dial Light	34-2068	#47 Bayonet (3 used on UHF Models)
M8	Tuner	76-7600-3	VHF
M9	Tuner	43-6701	UHF adaptor UT20B
M10	Switch	42-1996-6	UHF-VHF changeover
M11	Focus Magnet	76-8087	Includes centering device
M12	Ion Trap	76-6077-4	
M13	Correction Magnet	76-8474-1	(4 Used) anti-pin cushion
	Cabinet	11005	Models 24B6106, 24BU6106
	Cabinet	11005-3	Models 24B6106-L, 24BU6106-L
	Cabinet	11023	Models 24B6300, 24BU6300
	Knob	76-8457	Brightness, Vert. Hold (Models 24B6106, 24BU6106, 24B6300, 24BU6300 (2 used)
	Knob	76-8457-3	Brightness, Vert. Hold (Models 24B6106-L, 24BU6106-L(2 used)
	Knob	76-8455	Channel Selector (Models 24B6106, 24BU6106, 24B6300, 24BU6300)
	Knob	76-8455-4	Channel Selector (Models 24B6106-L 24BU6106-L
	Knob	76-6048-5	Contrast, Horiz.Hold (Models 24B6106, 24BU6106, 24B6300, 24BU6300 (2 used)
	Knob	76-6048-6	Contrast, Horiz.Hold (Models 24B6106-L, 24BU6106-L (2 used)
	Knob	76-8456	Fine tuning (All Models)
	Knob	76-6213-4	Tone (Models 24B6106, 24BU6106)
	Knob	76-8459	On/off/volume (Models 24B6106, 24BU6106, 24B6300, 24BU6300)
	Knob	76-8459-1	On/off/volume (Models 24B6106-L 24BU6106-L
	Knob	76-8508	UHF Selector (UHF Models only)
	Safety Glass	54-7943-72	
	Mask	54-9033-1	

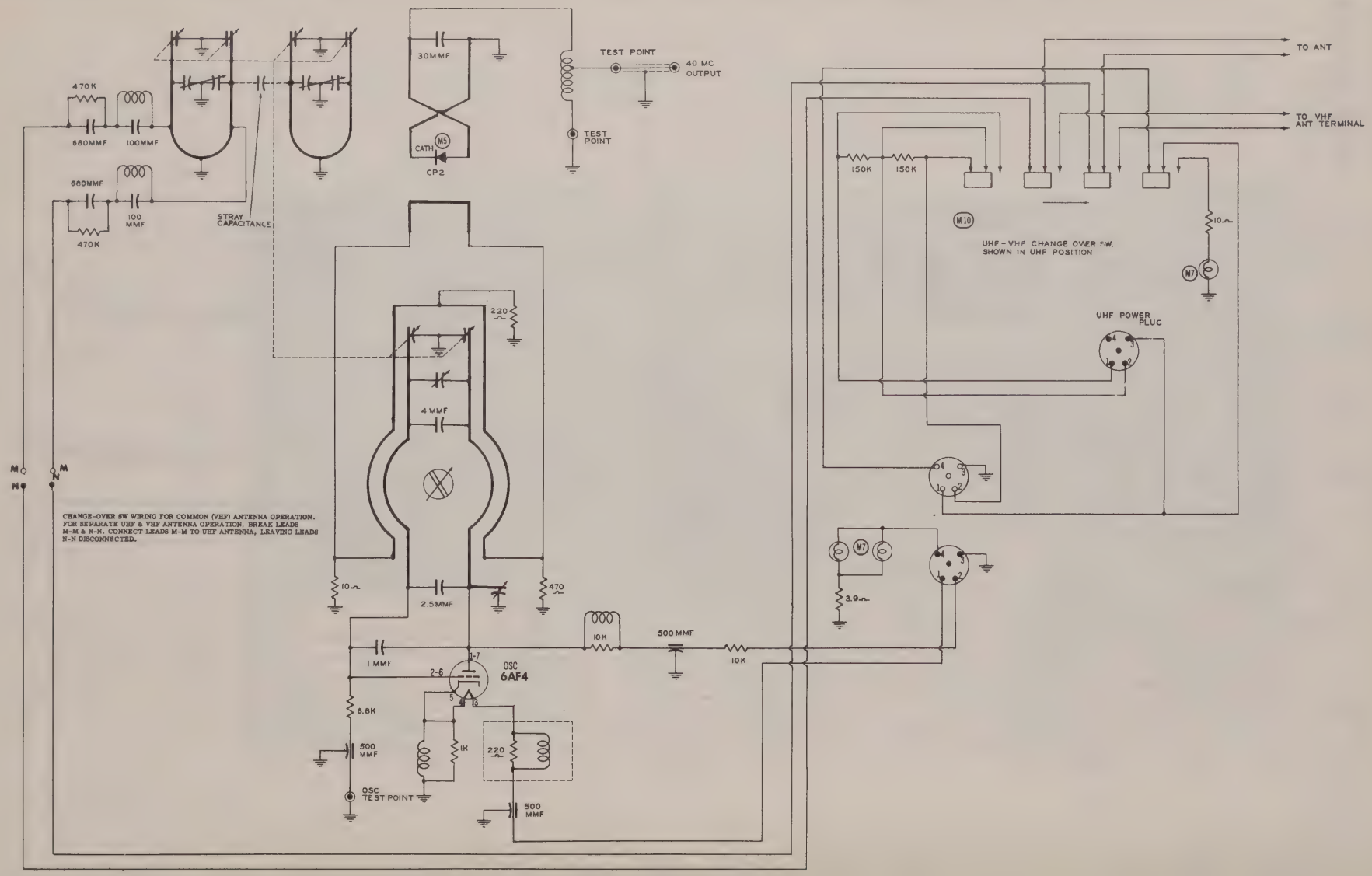


UHF DRIVE CORD STRINGING



SWEEP CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
[illegible] F. [illegible]
[illegible] MIAMI MIAMI ST.
DENVER, COLORADO



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PHILCO UHF TUNER MODEL 20B

UHF-TUNER SCHEMATIC

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly switch on volume control T1 and M4. If filaments light, check M1, M2 and other B+ filter components.

SMALL AND/OR DIM PIX

Measure B+ at 250 Volt point.

If Satisfactory	If Unsatisfactory
Follow procedure outlined under "Insufficient High Voltage".	Check M1, M2, C1, C2, C4A and other B+ filter components.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V18, V19, V20, V21 and V22. Check waveform W18.

If Satisfactory	If Unsatisfactory
Check R129, R130, R131, C117, C118, T3, T5A and other associated circuit components.	Check R123, C109, C110 and other associated circuit components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V18, V19, V20, V21 and V22. Measure B+.

If Satisfactory	If Unsatisfactory
Proceed as outlined under "Loss Of High Voltage".	Proceed as outlined under "Small and/or Dim Pix".

BLOOMING

Check by substitution V18, V19, V20, V21 and V22. Check R129, R130, R131, C117, C118, T3, T5A, picture tube and other associated circuit components.

GENERAL

RASTER SOUND NO PIX

Follow procedure outlined under "Loss Of Video".

RASTER PIX NO SOUND

Follow procedure outlined under "Weak Or No Sound".

RASTER NO SOUND NO PIX

Check by substitution V1, V2, V3, V4, V5 and V6. Check video detector assembly. Check components associated with the video IF strip.

NO RASTER NO SOUND

Follow procedure outlined under "Dead Set".

INTERMITTENT STREAKS

Check video signal for interference pulses. Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the RF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

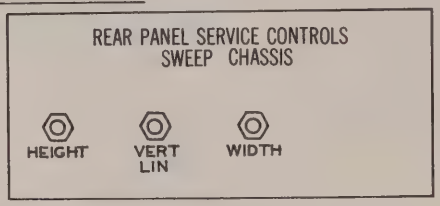
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove three (3) wood screws holding wood strip at the bottom of safety glass. Remove wood strip and safety. Use exteme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to set. Adjustment is located on top of chassis. Set the horizontal hold control at the center of its range and adjust the horizontal ringing coil slug (L41) until picture synchronizes horizontally. (For location see tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate Sound IF detector buzz, adjust the ratio detector secondary (L39) located on top of chassis. (See tube placement chart).

FUSES

Two fuses are used. One for power supply protection and one for filament winding protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering lever on the PM focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

ANTI-PIN CUSHION ADJUSTMENT

Reduce the picture size so that the sides of the raster are visible, and position the magnets so that all sides are straight lines and the corners are at right angles.

DISASSEMBLY INSTRUCTIONS

Remove 9 push on type control knobs from front panel.

Disconnect built-in antenna and transmission line.

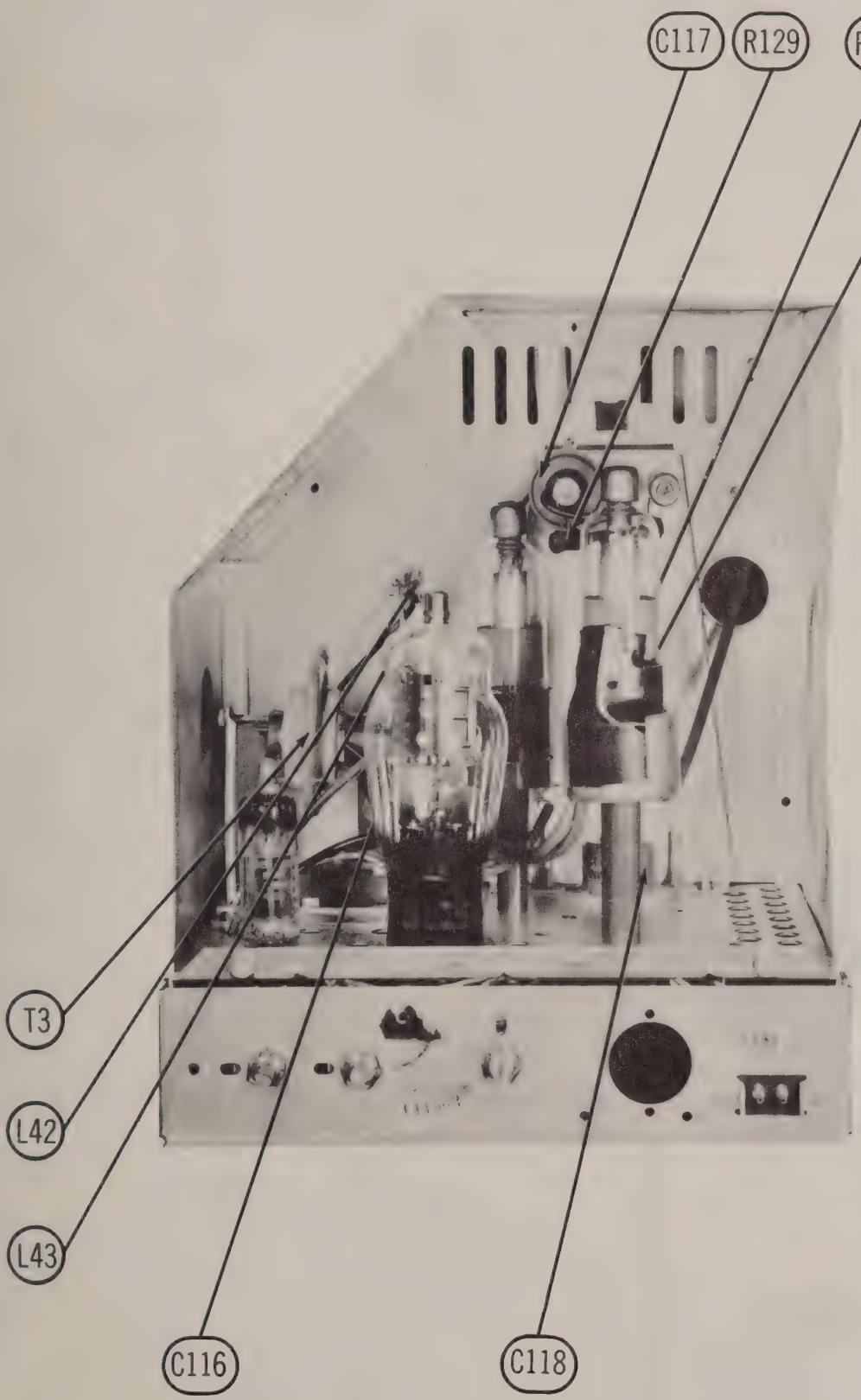
Remove 11 wood screws. Remove rear cover.

Disconnect speaker plug, CRT socket, yoke plug, HV plug, interconnecting chassis plugs and volume control cable.

Remove 4 chassis bolts from two chassis.

Remove both chassis.

Remove 4 speaker nuts. Remove speaker.



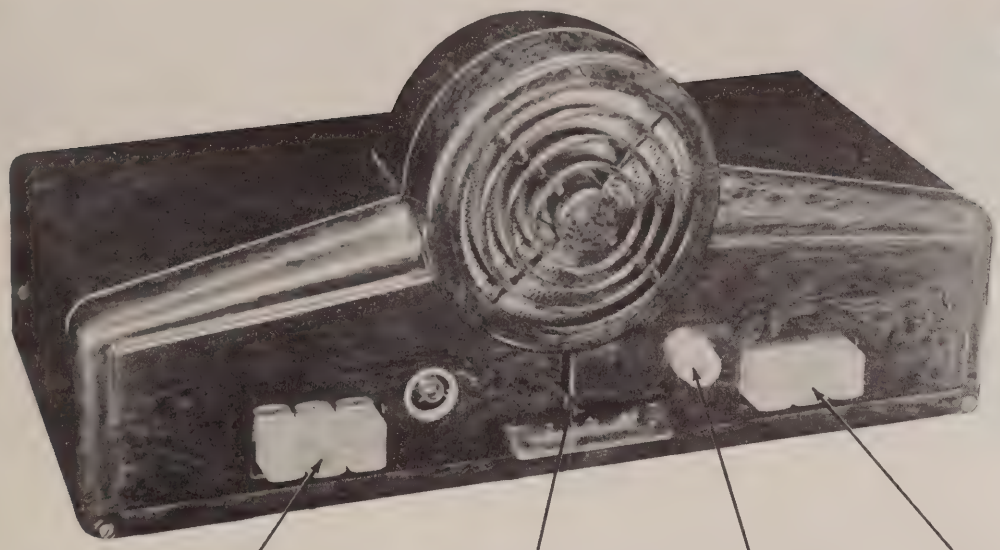
PHIL
L. F. BLANKENSH
3925 MEADE ST.
DENVER, COLORADO

HIGH VOLTAGE COMPARTMENT

RAULAND MODELS
2106-F, 2106H-F, 2112-F, 2112H-F

PROPERTY OF
L F E
DENVER, COLORADO

RAULAND MODELS
2106-F, 2106H-F, 2112-F, 2112H-F



RAULAND MODELS
2106-F, 2106H-F, 2112-F, 2112H-F

TRADE NAME	Rauland Models 2106-F, 2106H-F, 2112-F, 2112H-F
MANUFACTURER	Rauland-Borg Corp., 3515 Addison, Chicago 18, Ill.
TYPE SET	AC-DC Operated Intercommunication System Master Unit
TUBES (Two)	Types 12AU6 AF Amp. ,50B5 Audio Output
POWER SUPPLY	110-120 Volts AC-DC RATING .22 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		RAULAND PART No.	STANDARD REPLACEMENT		
V1	AF Amplifier	12AU6	12AU6	7BK	
V2	Audio Output	50B5	50B5	7BZ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	RAULAND PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▬50	150		AFH4-01		D001			R1374	
B	■40	150								
C	▲30	150								
D	30	150								
C2A	■15	150		AFH3-72		C048		FP306	[TVL-2425 [TVA-1409	
B	20	25								
C	▲40	25								
C3	220	500		1468-00025	D6-221	5W5T25	GP2K-221	MC-240	1FM-325	
C4	.047	600		P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C5	220	500		1468-00025	D6-221	5W5T25	GP2K-221	MC-240	1FM-325	
C6	.1	600		P688-1		PTE6P1		PT601	6TM-P1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	RAULAND PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	200Ω	2	RPW-201B					Incoming volume & SW
B	1 Meg	½						
R2A	1 Meg	½	RP-105W	Q13-137	AG-63-Z	AB-70	U-53	Outgoing volume
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R2A

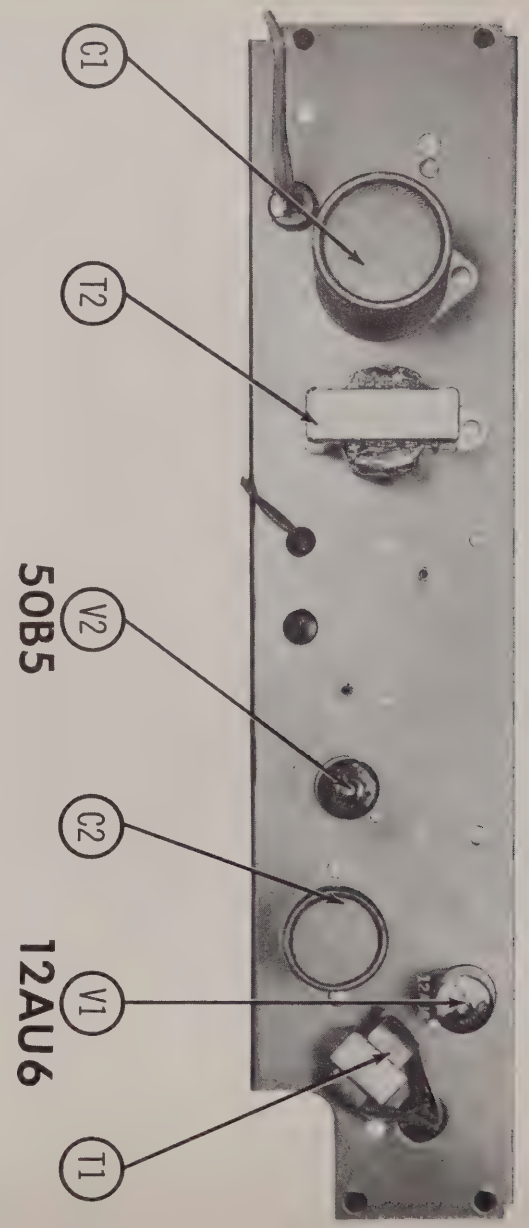
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RAULAND PART No.	IRC PART No.	
R3	6800Ω	½		BTS-6800	Note
R4	68Ω	½			
R5	47Ω	½			Note
R6	47Ω	1			Note
M7	10Ω	½			
R8	12KΩ	½		BTS-12K	
R9	470KΩ	½		BTS-470K	
R10	2. 2Meg	1		BTA-2. 2Meg	
R11	10KΩ	½		BTS-10K	

Note. Used only with hand-set.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RAULAND PART No.	IRC PART No.	
R12	100KΩ	½		BTS-100K	
R13	2. 2Meg	½		BTS-2. 2Meg	
R14	150Ω	½		BTS-150	
R15	400Ω	20		2D-400	
R16	68Ω	1			
R17	330KΩ	½		BTS-330K	
R18	220Ω	1		BTS-220	
R19	220Ω	1		BTA-220	
R20	2200Ω	½		BTS-2200	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	RAULAND PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	6.2Ω	512Ω Turns ratio 1 to 17			LA-0043					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	RAULAND PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	2.2KΩ	48Ω	LO-0056						

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	RAULAND PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	48Ω	US-0059		4A07Z45	

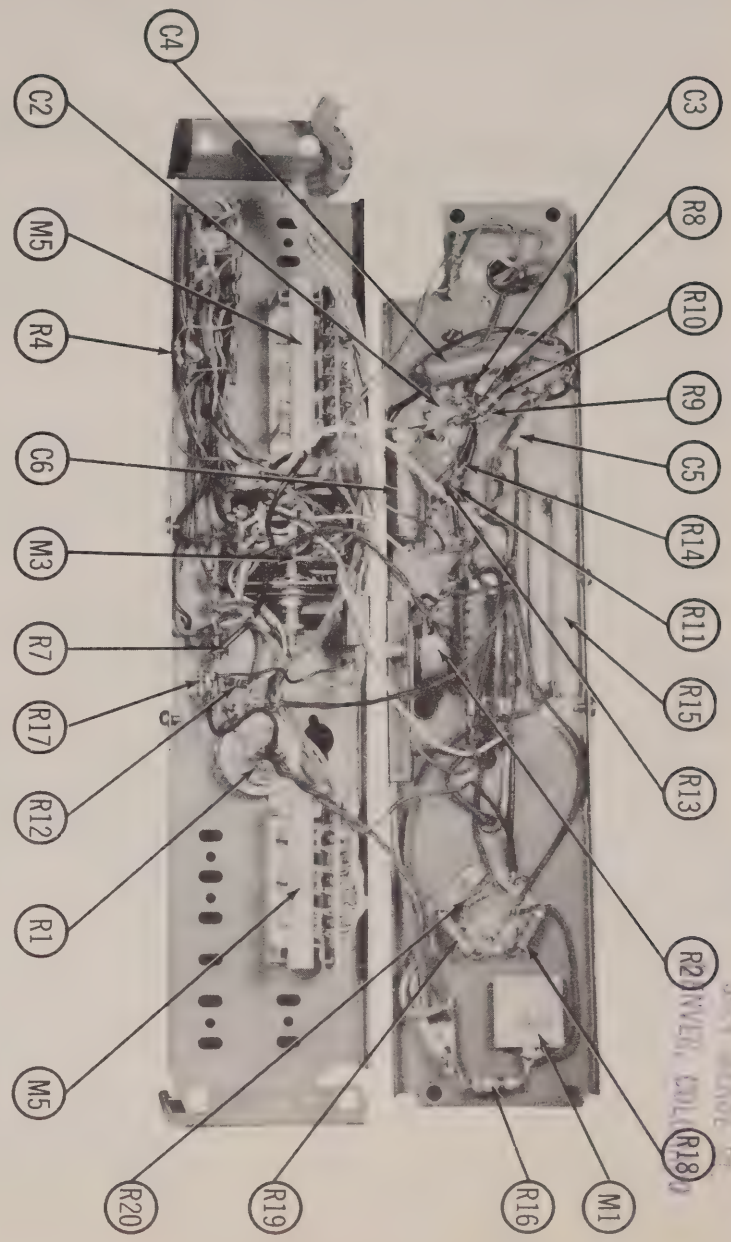
SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT	RAULAND PART No.	SELETRON PART No.	FEDERAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	
M1	.040A	JR-0013	8J1	1002A	6S65	65	

MISCELLANEOUS

ITEM No.	PART NAME	RAULAND PART No.	NOTES
M2	Pilot Light		Type NE61
M3	Switch	X-0254-A	Talk - listen selector
M4	Switch	X-0256-B	Model 2106HF, Model 2112HH cradle switch
M6	Handset	VC-0662	Model 2106HF, Model 2112HH
M5	Switch		Push button station selector (6 buttons) (Some models use 12 or 24 buttons)

CHASSIS—BOTTOM VIEW



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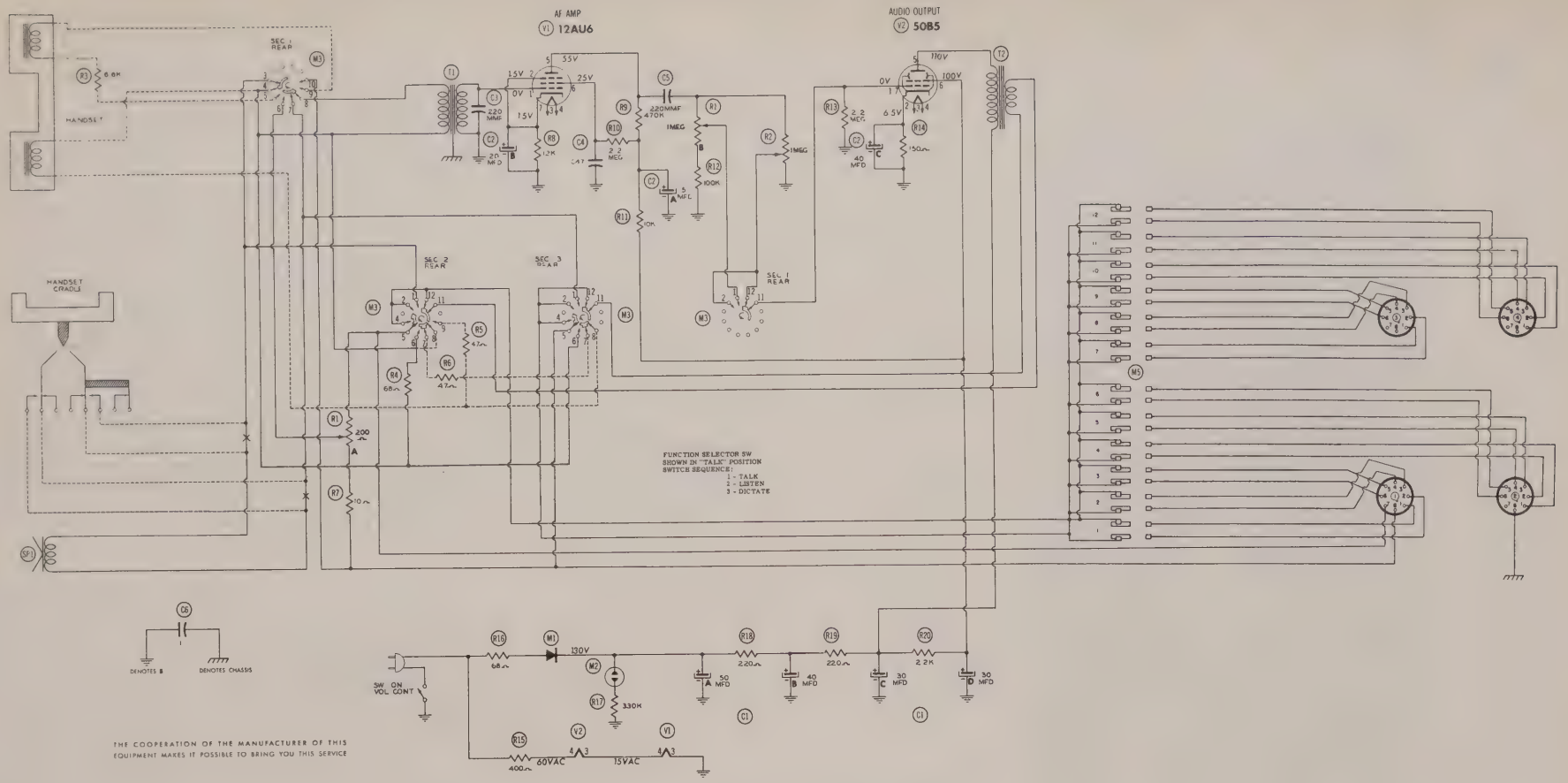
RAULAND MODEL 2106-F



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12AU6	450Ω	12KΩ	0Ω	12Ω	†490KΩ	†2.2Meg	12 KΩ
V 2	50B5	72KΩ	150Ω	12Ω	60Ω	†550Ω	†2.6KΩ	72KΩ

ALL MEASUREMENTS IN "LISTEN" POSITION
† MEASURED FROM OUTPUT OF M1

1 DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt
2 Socket connections are shown as bottom views
3 Measured values are from socket pin to common negative.
4 Line voltage maintained at 117 volts for voltage readings.
5 Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings
6 All controls at minimum, proper output load connected.

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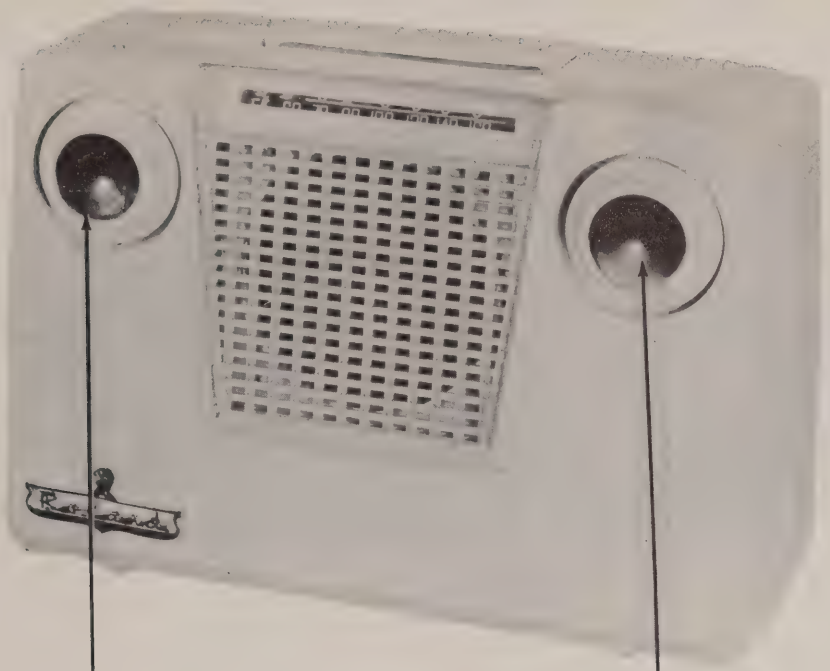
ROLAND
MODEL 6P2



VOLUME CONTROL ON-OFF SWITCH

TUNING CONTROL

ROLAND
MODEL 6P2

TRADE NAME	Roland Model 6P2
MANUFACTURER	Roland Radio Corp., 12-30 Anderson Ave., Mt. Vernon, N.Y.
TYPE SET	Three Power Portable Superheterodyne Receiver
TUBES (Five)	Types 1U4 RF Amp., 1R5 Conv., 1U4 IF Amp., 1U5 Det.-AVC-AF Amp., 3V4 Audio Output
POWER SUPPLY	110-120 Volts AC-DC (or) 7½ Volts "A" Supply & 90 Volts "B" Supply in Pack Form
RATING	.15 Amp. @ 117 Volts AC (or) 50MA @ 7½ Volts DC & 13MA @ 90 Volts DC
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Use battery power, if possible. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to antenna stator lug on tuning gang. Low side to B-.	455KC (400%Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum deflection.
2.		Loop	1620KC	"	"	A5	"
3.		"	1500KC	Tune to 1500KC signal	"	A6, A7	"

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PARTS LIST AND DESCRIPTIONS

ROLAND MODEL 6P2

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: ROLAND PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amp.	1U4	1U4	6AR	
V2	Converter	1R5	1R5	7AT	
V3	IF Amp.	1U4	1U4	6AR	
V4	Det-AVC-AF Amp.	1U5	1U5	6BW	
V5	Audio Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: ROLAND PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	40	150		PRS106D50A		BBRT4415-X25		3N529	R1483	Red
B	40	150								Green
C	200	25								Yellow
C2	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C3	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C4	.2	200		P288-2		PJ2P2		PT402	2TM-P2	
C5	.05	200		P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C6	.05	200		P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C7	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C8	.05	200		P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C9	5000			BPD-05	DD-502	K080	801-005	DC-525	5HK-D5	
C10	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C11	.002	400		P488-002	D6-202	CUB4D2	GP2-333-202	PT422	4TM-D2	
C12	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C13	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C14	.002	400		P488-002	D6-202	CUB4D2	GP2-333-202	PT422	4TM-D2	
C15	2000			BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C16	.2	400		P488-2		CUB4P2		PT402	4TM-D2	
C17	.05	400		489ZX-05		PJ4S5		PT415	4TM-S5	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA: Roland PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1 Meg	½	VC53	Q13-137	AG-63-Z	BSK-70-S	U-48	Volume
B	Shaft		Not Req.	KSS-3	Not Req.	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	76-2	SWB-2	Not Req.	US-27	Attach to R1A.

RESISTORS

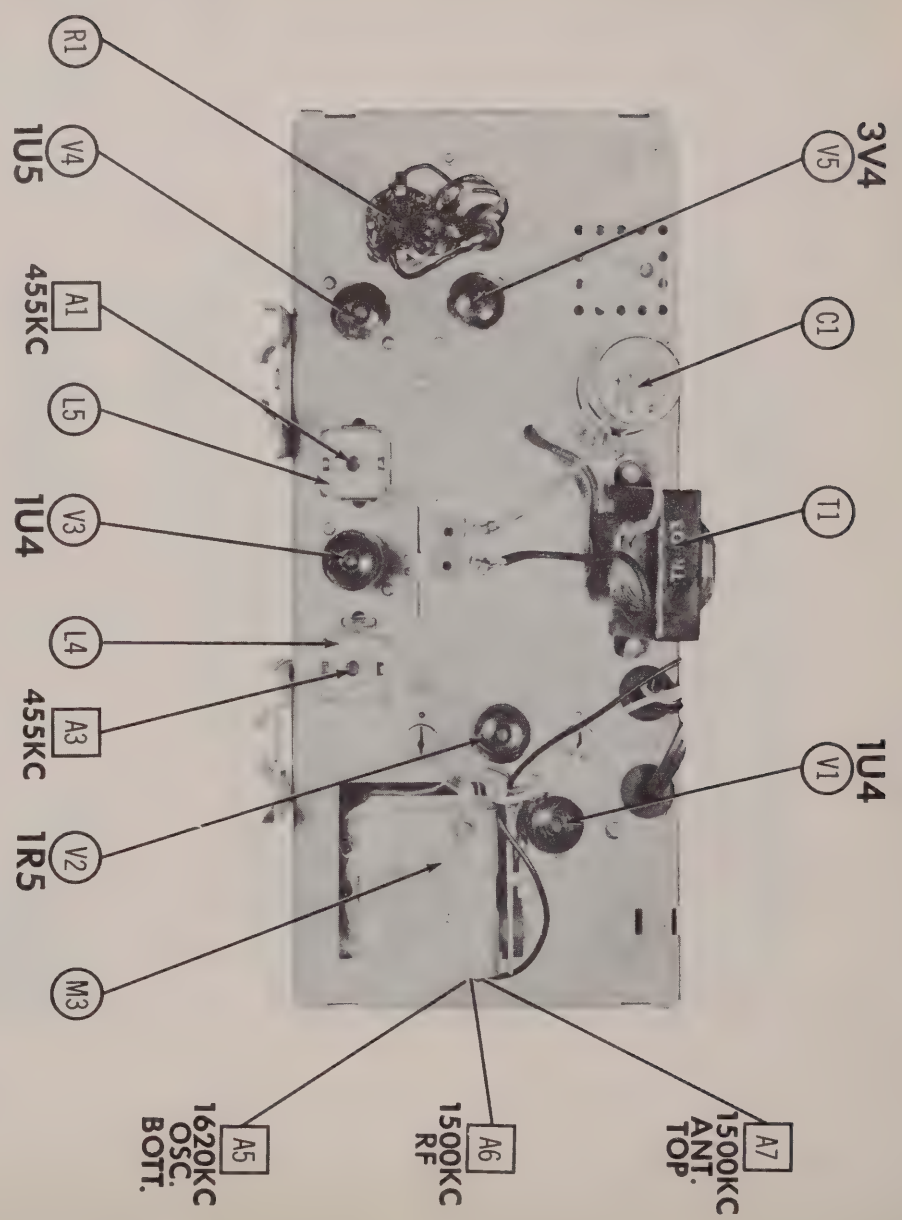
ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA: ROLAND PART No.	IRC PART No.	NOTES
R2	470KΩ	½		BTS-470K	
R3	8200Ω	½		BTS-8200	
R4	10KΩ	½		BTS-10K	
R5	100KΩ	½		BTS-100K	
R6	3. 3Meg	½		BTS-3. 3Meg	
R7	8200Ω	½		BTS-8200	
R8	2. 2Meg	½		BTS-2. 2Meg	
R9	10 Meg	½		BTS-10 Meg	
R10	4. 7 Meg	½		BTS-4. 7Meg	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA: ROLAND PART No.	IRC PART No.	NOTES
R11	220KΩ	½		BTS-220K	
R12	1 Meg	½		BTS-1 Meg	
R13	1000Ω	½		BTS-1000	
R14	1000Ω	½		BTS-1000	
R15	1500Ω	½		BTS-1500	
R16	1000Ω	½		BTS-1000	
R17	2700Ω	½		BTS-2700	
R18	2000Ω	10			
R19	47Ω	1			

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA: ROLAND PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	9. 7KΩ	3. 3Ω	TR-103	A-3879	A-2932	S-11X ①	Z1116		① Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	ROLAND PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.3Ω	SP42A	ST-113 Mod P4-X	4A07	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	ROLAND PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	1.3Ω						
L2	RF Coil	45Ω	4.2Ω		14-1072		70-RF	
L3	Osc. Coil	1.2Ω	9.5Ω		14-1073		69-Osc.	
L4	Input IF	19Ω	19Ω	LF-24	16-6758	BC-352	12-C1	
L5	Output IF	19Ω	19Ω	LF-24	16-6758	BC-353	12-C2	

SELENIUM RECTIFIER

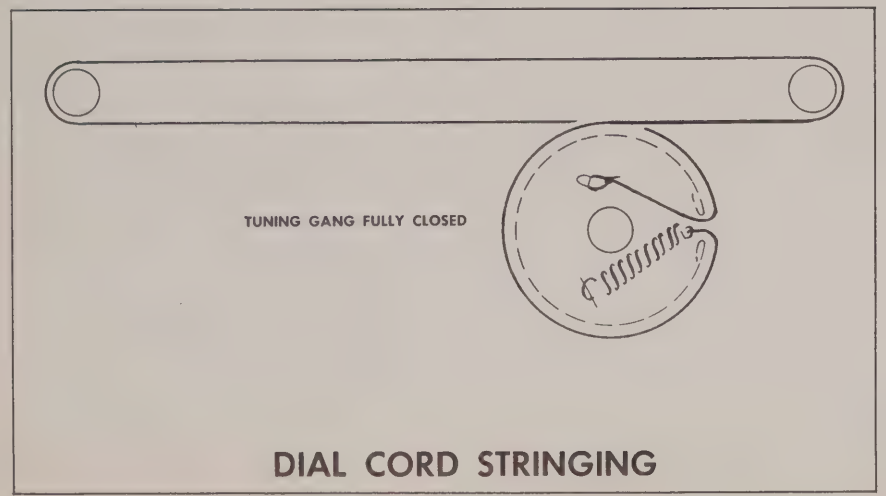
ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT	ROLAND PART No.	SELETRON PART No.	FEDERAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	
M1	.065		5M4	1003	6S75	75	

BATTERIES

ITEM No.	VOLTAGE	ROLAND PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M2	7 1/2 "A" 90V "B"				756			T6Z60	

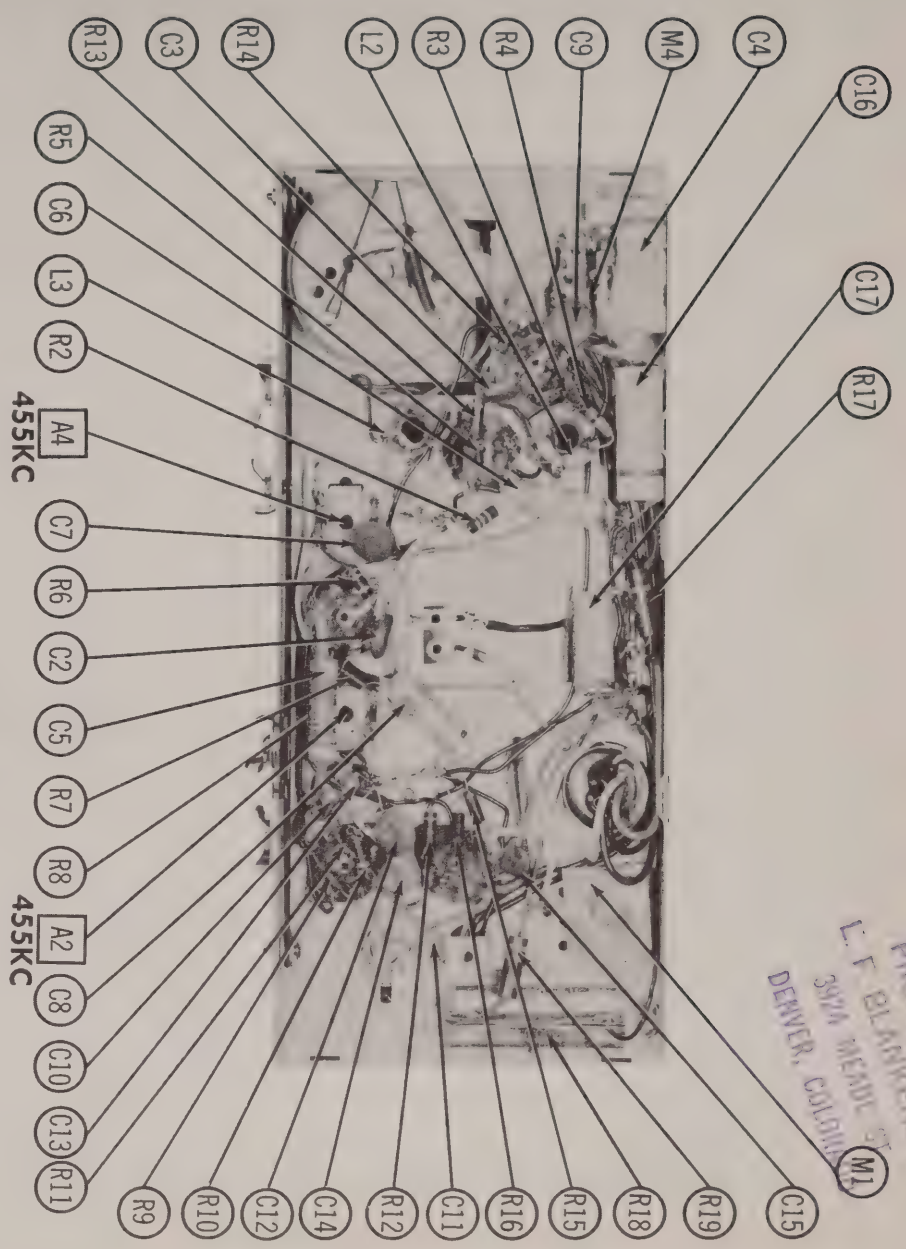
MISCELLANEOUS

ITEM No.	PART NAME	ROLAND PART No.	NOTES
M3	Tuning cap	CV-29	3 section (37-517 MMF, 10-210MMF, 11-85MMF)
M4	Switch		Power selector



DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



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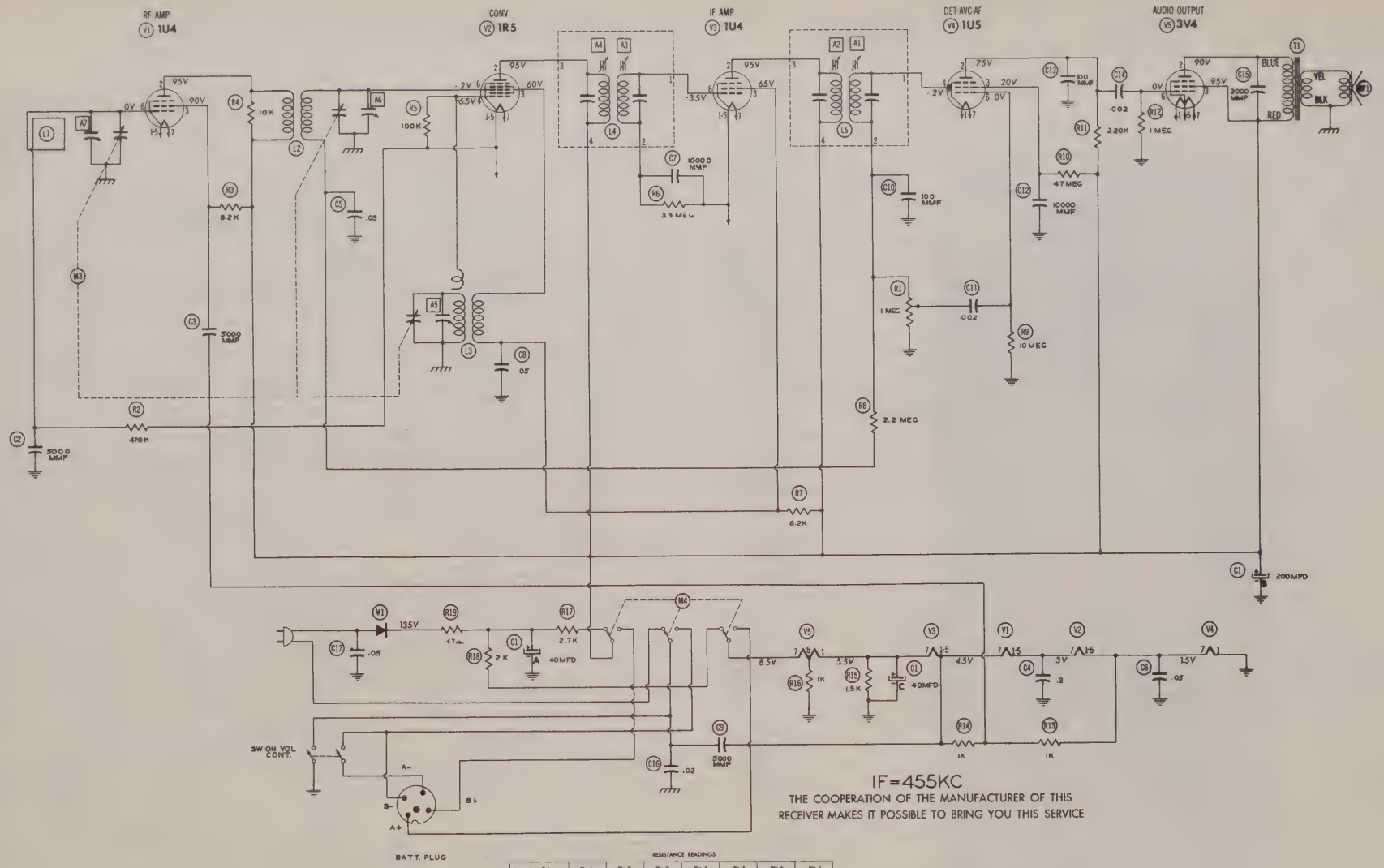
ROLAND MODEL 6P2



BATT. PLUG

IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1U4	*	†2.8KΩ	†1MEGΩ	1MEGΩ	*	470KΩ	*
V 2	1R5	*	†2.8KΩ	†1MEGΩ	100KΩ	*	3.3Meg	*
V 3	1U4	*	†2.8KΩ	†1MEGΩ	3.3Meg	*	3.3Meg	*
V 4	1U5	0Ω	†230KΩ	†4.7Meg	1Meg	†2.7KΩ	10Meg	*
V 5	3V4	*	†3.2KΩ	†2.7KΩ	DNF	*	1Meg	*

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE
† MEASURED FROM OUTPUT OF M2

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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STROMBERG-CARLSON
MODELS 621A Series, 622 Series

MODEL 622TM

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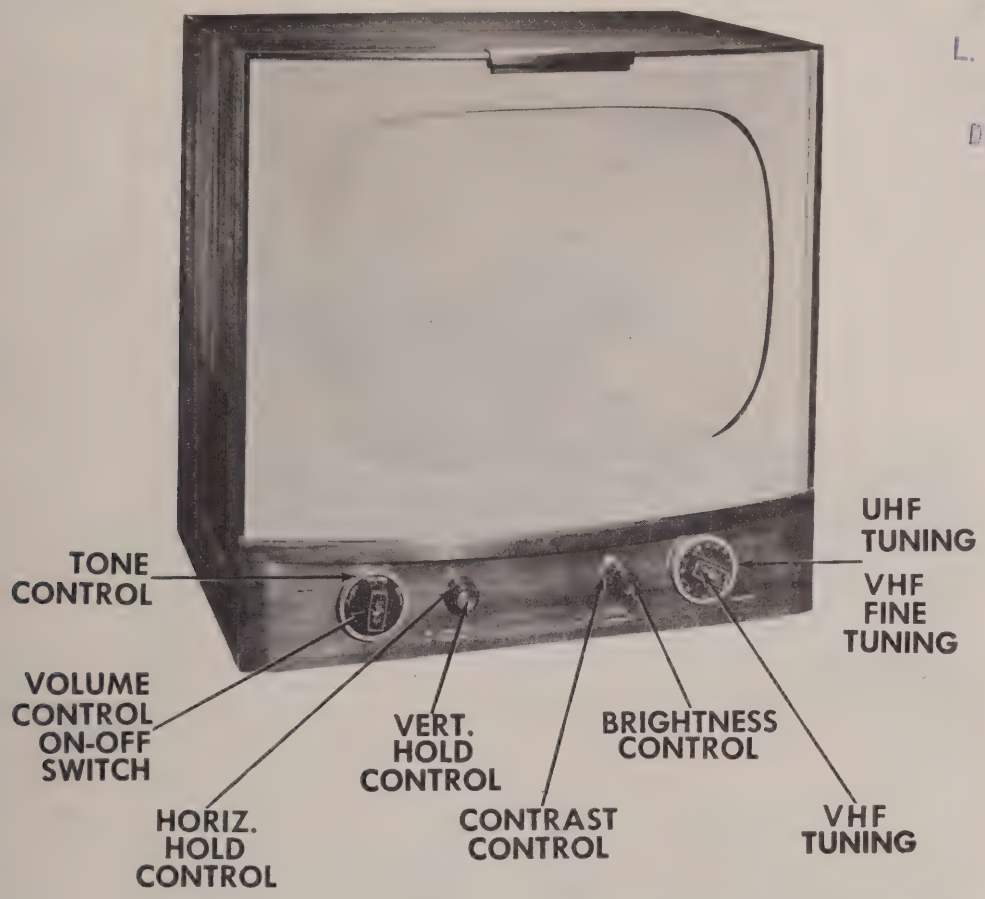

STROMBERG-CARLSON
MODELS 621A Series, 622 Series

STROMBERG-CARLSON MODEL 622TM

TRADE NAME	Stromberg-Carlson	MODELS 621ACM, 621ACO, 621ACDM, 621ACDO, 621ATM, 621ATO, 621AC5E, 621AC5I, 621AC5M, 621AC5O, 621AC5R, 622CM, 622CO, 622CDM, 622CDO, 622TM, 622TO, 622C5E, 622C5I, 622C5M, 622C5O, 622C5R.
MANUFACTURER	Stromberg-Carlson Co. - Service Dept., 302 N. Goodman St., Rochester, N.Y.	
TYPE SET	Television Receiver	
TUBES	Twenty-four	
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING 2.3 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)	

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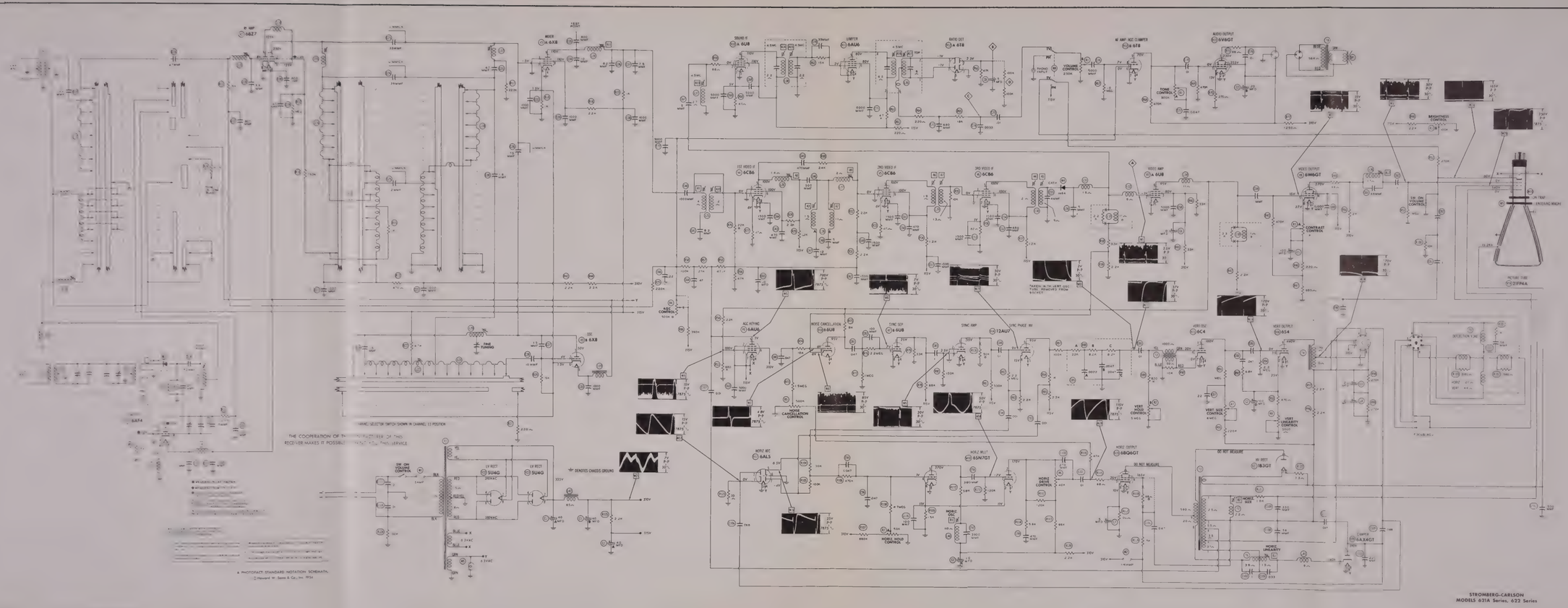

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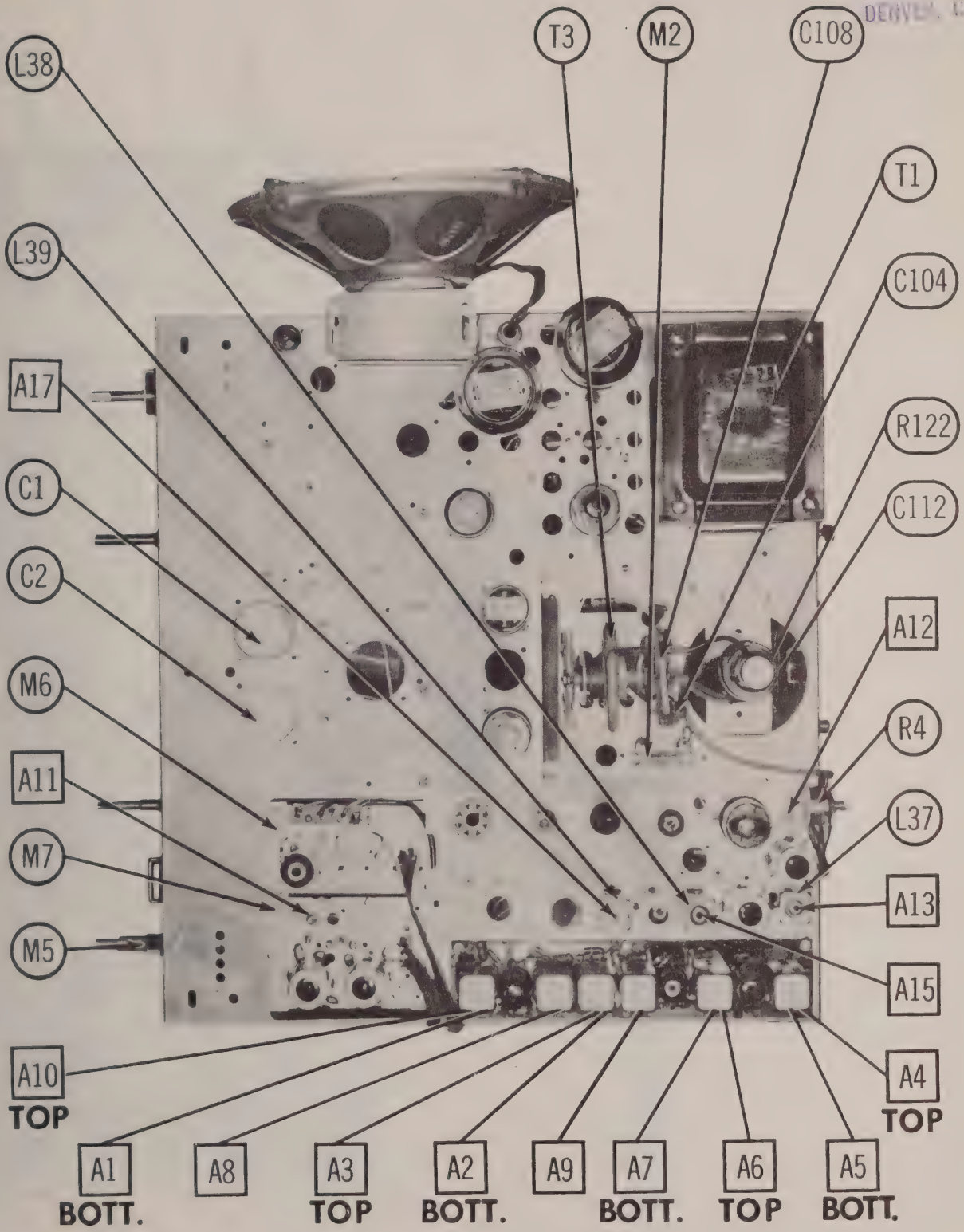

CHASSIS TOP VIEW

STROMBERG-CARLSON
MODELS 621A Series, 622 Series
CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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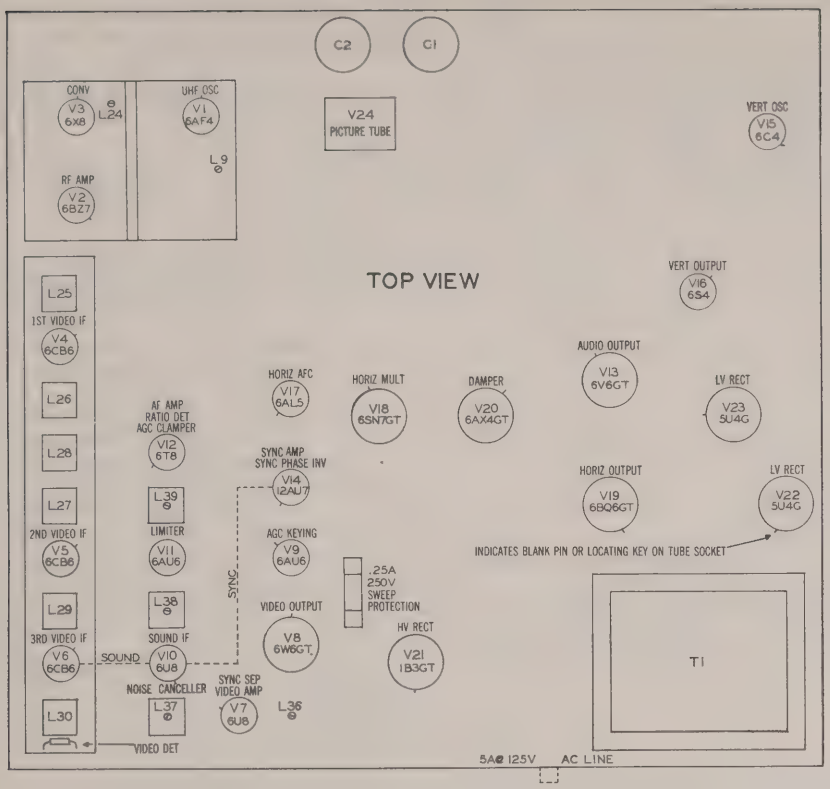
TUBE PLACEMENT CHART



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TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V22, V23, Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V3, V4, V5, V6, (V1 UHF only)
No pic, no sound, has snow - V2, V3, V4
No pic, has sound, has raster - V7, V8, V24
Has pic, no sound - V10, V11, V12, V13
Overloaded picture - V9, V12

SYNC FAILURE
No vert. sync - V14, V15
No horiz. sync - V14, V17, V18
No vert. or horiz. sync - V7, V14

SWEEP FAILURE
No raster, has sound - V18, V19, V20, V21, V24, Fuse (M2)
No vertical deflection - V15, V16
Poor vert. linearity or foldover - V15, V16
Poor horiz. linearity or foldover - V18, V19, V20
Narrow picture - V18, V19, V20, V21, V22, V23
Vert. off freq. - V14, V15
Horiz. off freq. - V14, V17, V18

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the horizontal oscillator tube (V18) from its socket.

VIDEO IF ALIGNMENT

Connect the negative lead of a 2 volt bias supply to the ungrounded side of C85. Connect the positive lead to chassis.
Attenuate the signal generator to maintain 2 volts peak to peak on scope.
Set the noise cancellation control fully counter clockwise.
Connect the synchronizated sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	100MMF	High side to pin 1 (grid) of 6CB6 (V4). Low side to chassis.	Not used	39.75MC (400∿Mod)	Any non-interfering channel	Vert. Amp. thru 47KΩ to point (A). Low side to chassis.	A1	Adjust for MINIMUM 400∿ indication on scope. Check marker position in step 6 (see Fig. 3).
2.	"	"	"	41.25MC	"	"	A2	"
3.	"	"	"	47.25MC	"	"	A3	"
4.	"	High side to pin 1 (grid) of 6CB6 (V6). Low side to chassis.	43MC (10MC Swp)	45.75MC 41.9MC	"	"	A4, A5	Adjust for response curve similar to Fig. 1.
5.	"	High side to pin 1 (grid) of 6CB6 (V5). Low side to chassis.	"	"	"	"	A6, A7	Adjust for response curve similar to Fig. 2.
6.	"	High side to pin 1 (grid) of 6CB6 (V4). Low side to chassis.	"	"	"	"	A8, A9	Adjust for response curve similar to Fig. 3.
7.	Direct	High side to an ungrounded tube shield floating over converter tube (V3). Low side to chassis.	"	"	"	"	A10, A11	Adjust for response curve similar to Fig. 4.

4.5MC TRAP ALIGNMENT

Set contrast control for maximum contrast.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	100MMF	High side to point (A). Low side to chassis.	Not used	4.5MC (400∿Mod)	Any	Vert. Amp. thru detector (Fig. 5) to pin 2 of picture tube. Low side to chassis.	A12	Adjust for MINIMUM 400∿ indication scope.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point (B) to chassis. The junction of these two resistors is alignment point (D) as shown on the schematic.
Remove the 3rd. Video IF amplifier tube (V6) from its socket.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	100MMF	High side to pin 2 (grid) of 6U8 (V7A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (B) Common to chassis.	A13, A14, A15, A16	Adjust for maximum deflection.
10.	"	"	"	"	DC probe to point (C) Common to point (D).	A17	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Replace V6 in its socket.

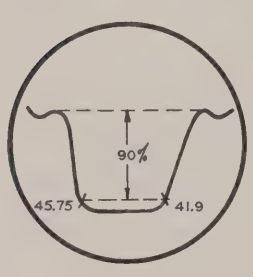


FIG. 1

FIG. 2

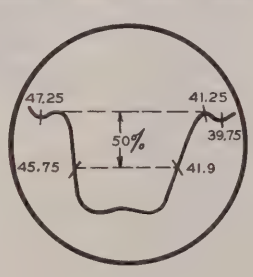


FIG. 3

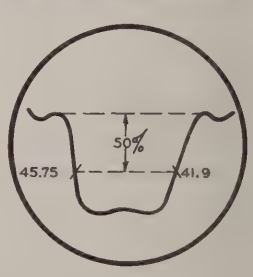


FIG. 4

PROPERTY OF
L F [illegible]
[illegible]
DENVER, COLORADO

ALIGNMENT INSTRUCTIONS (cont)

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection. Remove the 3rd. video IF amplifier tube (V6) from its socket.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	100MMF	High side to pin 2 (grid) of 6U8 (V7A). Low side chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point (B). Low side to chassis.	A13, A14 A15, A16	Disconnect stabilizer capacitor C8. Adjust for curve of maximum amplitude and symmetry similar to Fig. 6.
10.	"	"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	A17	Reconnect stabilizer capacitor C8. Adjust so that 4.5MC occurs at center of cross-over lines as in Fig. 7. SLIGHTLY retouch A16 for maximum amplitude and symmetry of crossover lines.

VHF TUNER AND UHF TUNER ALIGNMENT

The VHF tuner and UHF tuner portions of this receiver have been properly aligned at the factory and are very stable. Alignment of these portions should not be required in the field.

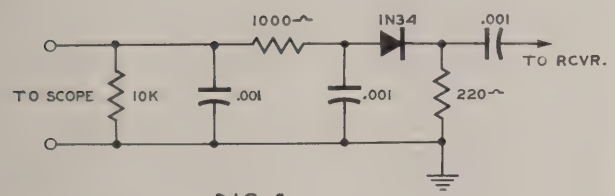


FIG. 5

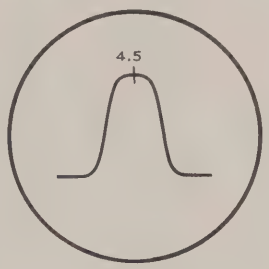


FIG. 6

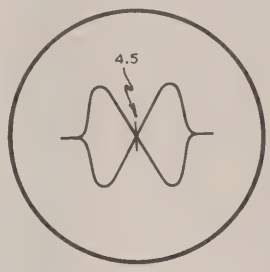
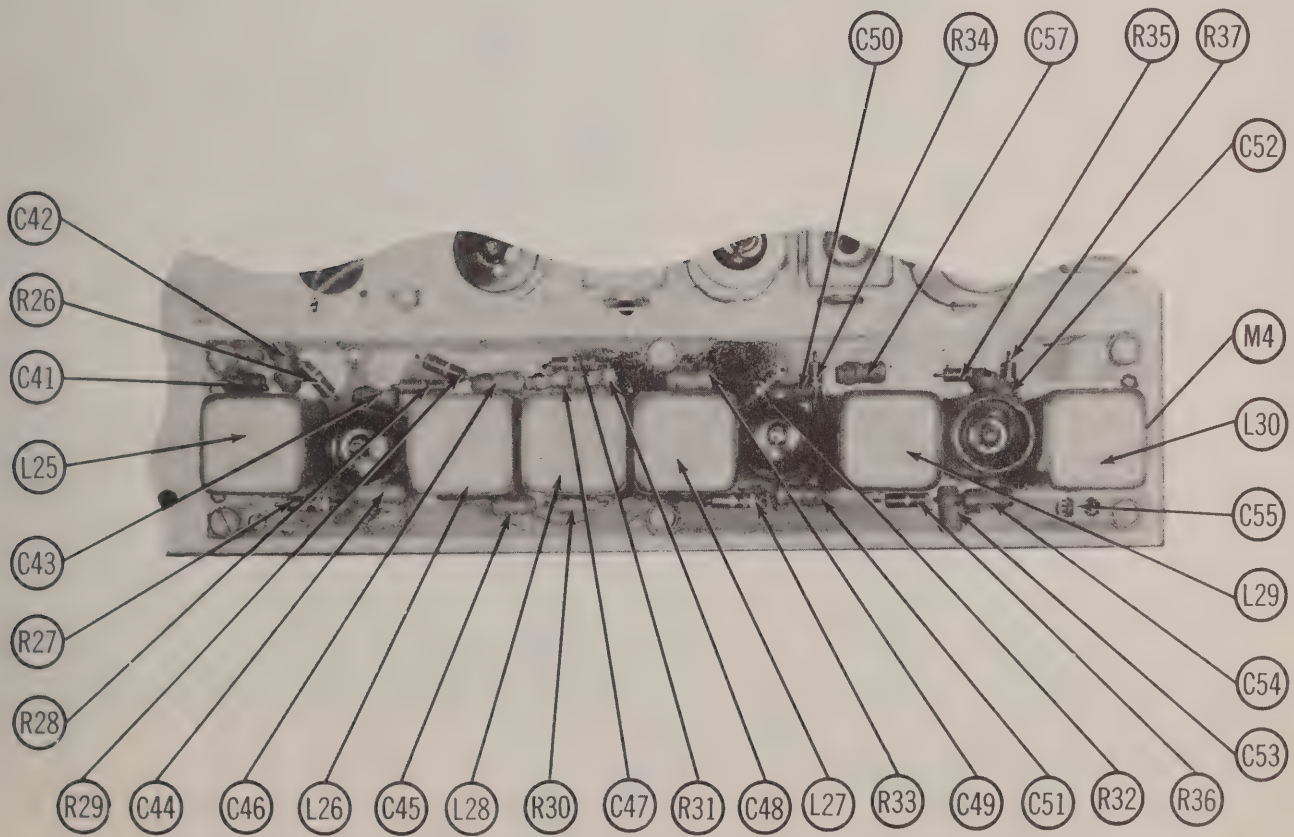


FIG. 7

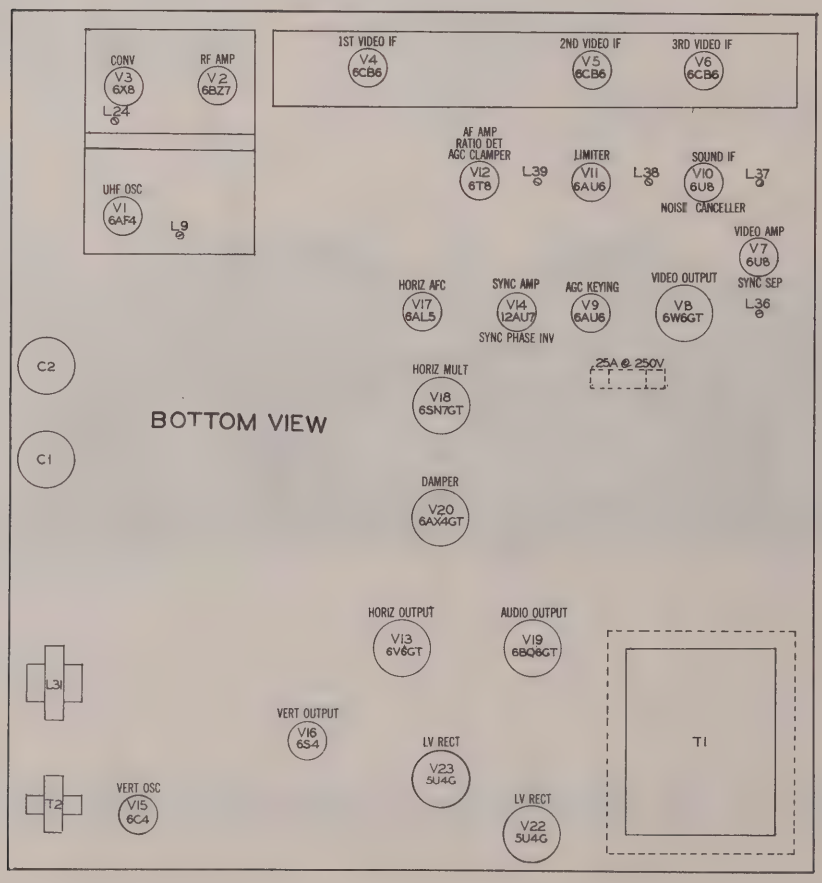


VIDEO IF STRIP

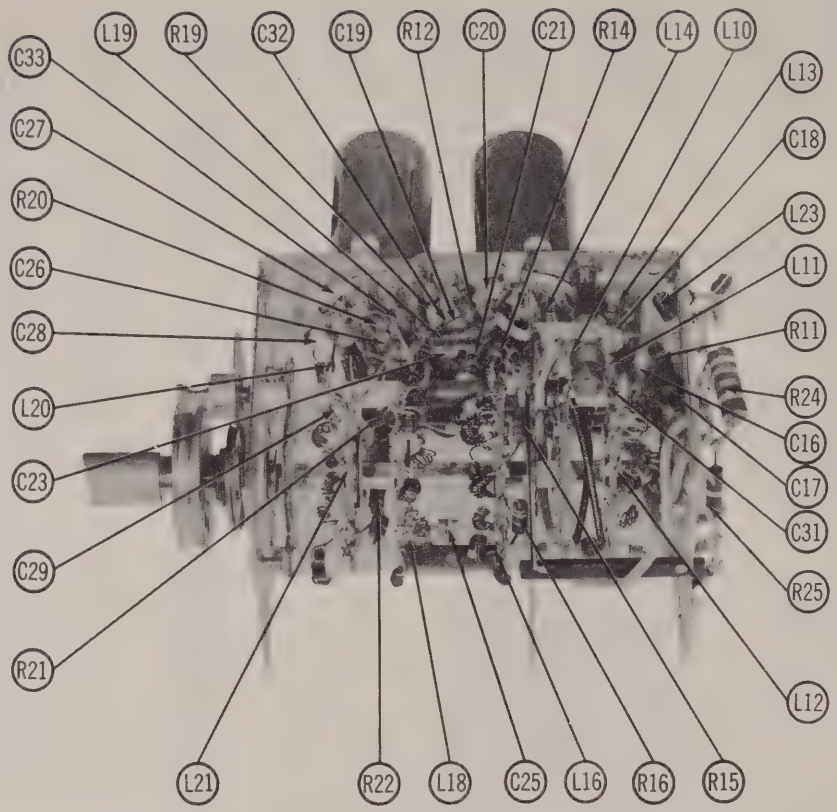
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AF4	■†4.5KΩ	15KΩ	0Ω	.1Ω	0Ω	15KΩ	■†4.5KΩ		
V 2	6BZ7	†5KΩ	470KΩ	INF	.1Ω	0Ω	INF	530KΩ	0Ω	0Ω
V 3	6X8	0Ω	15KΩ	†7KΩ	0Ω	.1Ω	200Ω	220KΩ	†4.5KΩ	†3.3KΩ
V 4	6CB6	69KΩ	47Ω	0Ω	.1Ω	†3.4KΩ	†5.6KΩ	0Ω		
V 5	6CB6	71KΩ	47Ω	0Ω	.1Ω	†3.4KΩ	†3.4KΩ	0Ω		
V 6	6CB6	1.5Ω	82Ω	0Ω	.1Ω	†3.4KΩ	†3.4KΩ	0Ω		
V 7	6U8	27KΩ	5.5KΩ	†25KΩ	.1Ω	0Ω	2.3KΩ	0Ω	0Ω	3.2Meg
V 8	6W6GT	680Ω	.1Ω	†2.2KΩ	†2.3KΩ	470KΩ	▲1.8KΩ	0Ω	1.6KΩ	
V 9	6AU6	†26KΩ	†2.2KΩ	†2.2KΩ	†2.2KΩ	300KΩ	†68Ω	†2.2KΩ		
V 10	6U8	†22KΩ	70Ω	†2.5KΩ	.1Ω	0Ω	†2.5KΩ	47Ω	2.2KΩ	1.7Meg
V 11	6AU6	15KΩ	0Ω	0Ω	.1Ω	†2.5KΩ	†2.5KΩ	0Ω		
V 12	6T8	INF	47KΩ	INF	.1Ω	0Ω	270KΩ	0Ω	10Meg	†470KΩ
V 13	6V6GT	INF	0Ω	†2KΩ	†1.3KΩ	470KΩ	INF	.1Ω	270Ω	
V 14	12AU7	†130KΩ	0Ω	150KΩ	.1Ω	.1Ω	†5.5KΩ	2.2Meg	2.2KΩ	0Ω
V 15	6C4	▲3Meg	INF	0Ω	.1Ω	▲3Meg	1.6Meg	150Ω		
V 16	6S4	INF	2KΩ	2.2Meg	0Ω	.1Ω	2.2Meg	INF	INF	▲5.5KΩ
V 17	6AL5	33Ω	33Ω	0Ω	.1Ω	5Meg	INF	5Meg		
V 18	6SN7GT	120KΩ	†100KΩ	1.5KΩ	4.7Meg	†8KΩ	1.5KΩ	.1Ω	0Ω	
V 19	6BQ6GT	†15KΩ	0Ω	INF	†15KΩ	550KΩ	550KΩ	.1Ω	100Ω	TOP CAP ▲27Ω
V 20	6AX4GT	INF	INF	500KΩ	INF	†75Ω	▲2Ω	0Ω	.1Ω	
V 21	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲620Ω
V 22	5U4G	INF	25KΩ	INF	15Ω	INF	16Ω	INF	25KΩ	
V 23	5U4G	INF	25KΩ	INF	15Ω	INF	16Ω	INF	25KΩ	
V 24	21FP4A	†2.2KΩ	1Meg	PIN 6 0Ω	PIN 10 ▲1.8KΩ	PIN 11 †320KΩ	PIN 12 †2.2KΩ			

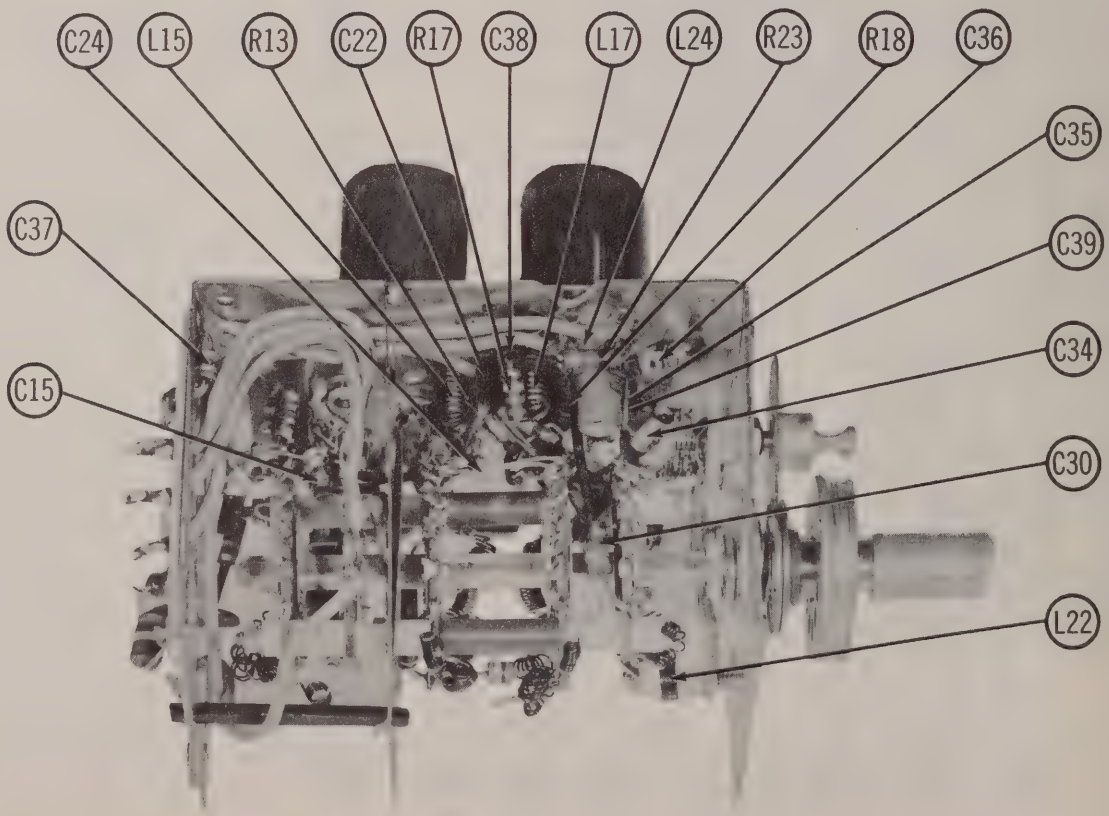
† MEASURED FROM PIN 8 OF V23
▲ MEAUSRED FROM PIN 3 OF V20
■ MEASURED IN UHF POSITION



TUBE PLACEMENT CHART



VHF TUNER-RIGHT SIDE



VHF TUNER-LEFT SIDE

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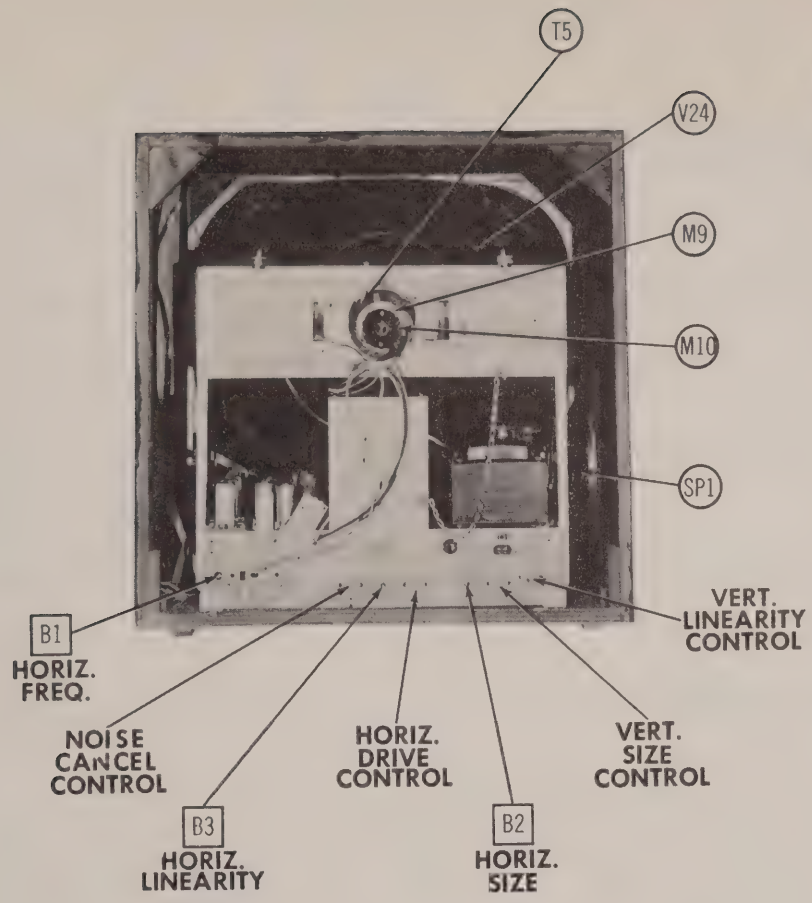


CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

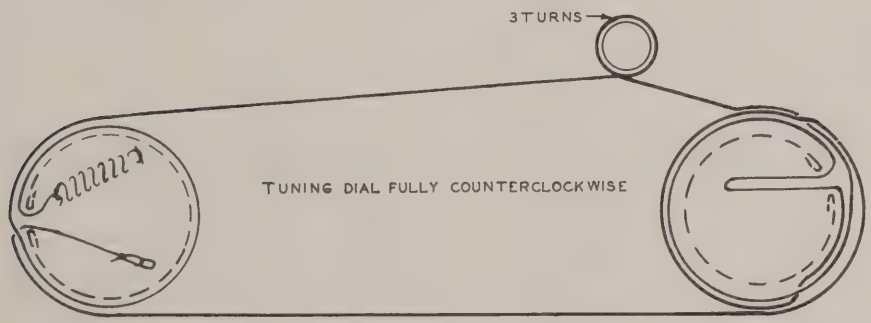
Set the horizontal hold control to its mid-range position.

Adjust the horizontal oscillator slug (B1) until the picture synchronizes horizontally.

Adjust the horizontal drive control for the best compromise between brightness and horizontal linearity.

Adjust the horizontal size slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the linearity slug (B3) for a picture that is symmetrical from left to right.



TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss Of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V18, V19, V20, V22 and V23. Check adjustment of the horizontal drive control, B2 and B3. Check waveform W19.

If Satisfactory	If Unsatisfactory
Check C105, C110, C111, R119, T3, T5A and other associated circuit components.	Check C98, C100, C101, R6A, R110, R112, R113 and other associated components.

DRIVE LINES

Check adjustment of the horizontal drive control. Check by substitution V18, V19 and V20. Check C105, C110, C111, C100, C101, C99, T3, T5A, R6A, R112, R113 and other associated circuit components for failure or change of value.

COMPRESSED LEFT SIDE

Check by substitution V18, V19 and V20. Check adjustment of the horizontal drive control, B2 and B3. Check horizontal output and damper circuit components especially T3 and T5A for failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V18, V19 and V20. Check C96 for open. Check T3, T5A, T6, T7 and other associated components.

XMAS TREE EFFECT

Substitute V18. Check C97, C98, L40 and other associated circuit components for failure or change of value.

VERTICAL

LOSS OF SWEEP

Check by substitution V15 and V16. Check waveform W13.

If Satisfactory	If Unsatisfactory
Check T4, T5B and other associated circuit components.	Check C88, C89, R91, R94, T2 and other associated components.

INSUFFICIENT SWEEP

Check adjustment of height and vertical linearity controls. Proceed as outlined under "Loss Of Sweep".

COMPRESSED AT BOTTOM

Check by substitution V15 and V16. Check T4, T5B, C2D and other associated circuit components.

COMPRESSED AT TOP

Check by substitution V15 and V16. Check T2, C88, C89, R91, R94 and other associated circuit components.

FOLDS

Check by substitution V15 and V16. Check associated circuit components for failure or change of value.

SYNC

LOSS OF HORIZONTAL AND VERTICAL SYNC

Check by substitution V10, V7 and V14. Check components associated with V10B, V7B and V14 especially C81, C83 and C84.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Check by substitution V7, V10, V14 and V15. Check waveform W11.

If Satisfactory	If Unsatisfactory
Check components associated with V15 especially T2 and C86.	Check vertical integrator and other associated components.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Check by substitution V17 and V18. Check associated circuit components especially C98 and C97.

HORIZONTAL BENDING

Check by substitution V17, V18 and V19. Check the horizontal AFC filter network components for failure or change of value.

VIDEO

LOSS OF VIDEO

Check by substitution V7 and V8. Check picture tube and other associated circuit components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best picture and sound. Check adjustment A12. Check video IF alignment.

POOR CONTRAST

Check by substitution V7 and V8. Check contrast control, C5, picture tube and other associated components.

NEGATIVE PIX

Check by substitution V7, V8 and V9. Check AGC network for component failure. Check picture tube.

SMEAR

Check by substitution V7 and V8. Check C59, C62, R42, R50, R51, L34, L35, picture tube and other associated circuit components for failure or change of value.

WIDE BLACK BAR ACROSS PIX

Check V2, V3, V4, V5, V6, V7, and V8 for heater to cathode leakage. Check B+ filter capacitors for open. In case of UHF check V1.

AUDIO

WEAK OR NO SOUND

Check by substitution V10, V11, V12 and V13. Check stages V12B and V13 using audio signal generator. Apply audio signal across R67.

If Satisfactory	If Unsatisfactory
Check ratio detector and Audio IF alignment and components.	Check components associated with V12B and V13 especially C78 and T8.

BUZZ

Adjust tuner fine tuning for best picture and sound. Adjust A17 for minimum buzz. If still unsatisfactory substitute V12 and realign audio IF and ratio detector stages.

DISTORTED

Follow procedure outlined under "Weak Or No Sound".

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: Stromberg Carlson PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	UHF Oscillator	6AF4	6AF4	7DK	
V2	RF Amplifier	6BZ7	6BZ7	9AJ	
V3	Converter	6X8	6X8	9AK	
V4	1st Video IF Amp.	6CB6	6CB6	7CM	
V5	2nd Video IF Amp.	6CB6	6CB6	7CM	
V6	3rd Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Amplifier				
	Sync Separator	6U8	6U8	9AE	
V8	Video Output	6W6GT	6W6GT	7S	
V9	AGC Keying	6AU6	6AU6	7BK	
V10	1st Sound IF Amp.				
	Noise cancellation	6U8	6U8	9AE	
V11	Limiter	6AU6	6AU6	7BK	
V12	Ratio Detector				
	AF Amplifier				
	AGC Clamper	6T8	6T8	9E	
V13	Audio Output	6V6GT	6V6GT	7S	
V14	Sync Amplifier				
	Sync Phase Inv.	12AU7	12AU7	9A	
V15	Vert. Oscillator	6C4	6C4	6BG	
V16	Vert. Output	6S4	6S4	8AC	
V17	Horiz. AFC	6AL5	6AL5	6BT	
V18	Horiz. Mult.	6SN7GT	6SN7GT	8BD	
V19	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V20	Damper	6AX4GT	6AX4GT	4CG	
V21	HV Rectifier	1B3GT	1B3GT	3C	
V22	LV Rectifier	5U4G	5U4G	5T	
V23	LV Rectifier	5U4G	5U4G	5T	

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L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: Stromberg-Carlson PART No.	SYLVANIA PART No.	GENERAL ELECTRIC PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V24	21FP4A	21FP4A 21FP4 ①	21FP4A	21FP4A	12L	① Circuit change necessary.

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Stromberg-Carlson PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	450	111095	AFH2-57		B045		FP238	TVL-2764	
B	▲40	450								
C2A	▲40	450	111104	AFH4-83		D062		FP432.9	TVL-4740	
B	■20	450							TVA-1705	
C	▲10	450								
D	100	50								
C3	20	300	111089	PRS450/20		BR2035		TC65	TVA-1608	
C4	20	300	111089	PRS450/20		BR2035		TC65	TVA-1608	
C5	100	50	111107	PRS50/100		BRH501		TC3501	TVA-1310	
C6	10	250	111106	PRS250/12		BR1225		TC52	TVA-1504	
C7	5	50	111093	PRS150/4		BR550		TC30	TVA-1303	
C8	5	50	111093	PRS150/4		BR550		TC30	TVA-1303	
C9	1.5		171265							
C10	1000		171233	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C11	.7		171598							
C12	1000		171233	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C13	22		171287							
C14	82		171288	SI82	D6-820	G040	GP1K-820		5GA-Q82	
C15	22		171299	SI22	D6-220	TP22	GP1K-220	UC-5422	5GA-Q22	
C16	47		110402	SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C17	800		171298	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C18	3.9		171300							
C19	470		171498	BPD-00047	D6-471	K060		UC-5347	5GA-T47	
C20	800		171298	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C21	1000		171301							
C22	1000		171233	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C23	.33		171499							
C24	.39		171500							
C25	2		171501							
C26	.75		171599							
C27	1.5		171265							
C28	10		171264	SI10NP0	TCZ-10	TZ09	NP0K-100	ZT-541	5TCC-Q1	
C29	1.5		171267	SI1.5NP0	TCZ-1.5	TZ04	NP0K-1R5	ZT-5515	5TCCB-V15	
C30	1.6		171266							
C31	47		110402	SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C32	1000		171233	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C33	1000		171298	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C34	10		171264	SI10NP0	TCZ-10	TZ09	NP0K-100	ZT-541	5TCC-Q1	
C35	800		171298	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C36	82		171269	SI82	D6-820	G040	GP1K-820	UC-5482	5GA-Q82	
C37	7.5		171270							
C38	1000		171233	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C39	1000		171233	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C40	1000		110824	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C41	8.2		171239			Z016	NP0K-8.2			
C42	1500		171240	SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C43	470		171241	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C44	1500		171240	SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C45	470		171241	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C46	1500		171240	SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C47	12		171242				N220K-120			
C48	5		171243				N470K-050			
C49	1500		171240	SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C50	470		171241	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C51	1500		171240	SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C52	680		171244	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C53	1500		171240	SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C54	1500		171240	SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C55	4		171245			Z009	NP0K-040			

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP	RATING VOLT	Stromberg-Carlson PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C56	5		110598	RI5	D5-050	TP05	GP1K-050	UC-555	5GA-V5	
C57	1500		171240	RI500	D5-152	TP54	GP2L-152	UC-5215	5HK-D15	
C58	5000		110586	BPD-005	DD-502	K080	811-005	DC-535	5HK-D5	
C59	.1	400	110734	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C60	10000		110672	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C61	50		110459	SI50	D5-500	TP32	GP1K-500	UC-5468	5GA-Q56	
C62	.1	400	110734	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C63	5000		110586	BPD-005	DD-502	K080	811-005	DC-535	5HK-D5	
C64	.47	300	110531	P282-47		CUB3P47		PT4047	2TM-P47	
C65	1.0	100	110823	484-1.0		CUB4W1		PT41	2TM-M1	
C66	.22	200	110707	P488-22		CUB4P22		PT4022	4TM-P22	
C67	5		110598	SI5	D5-050	TP05	GP1K-050	UC-555	5GA-V5	
C68	5000		110589	BPD-005	DD-502	K080	811-005	DC-535	5HK-D5	
C69	5000		110586	BPD-005	DD-502	K080	811-005	DC-535	5HK-D5	
C70	33		110466	SI33	D5-330	TP37	GP1K-330	UC-5433	5GA-Q33	
C71	10000		110672	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C72	5000		110586	BPD-005	DD-502	K080	811-005	DC-535	5HK-D5	
C73	560		110465	SI560	D5-561	TP50	GP2K-561	UC-5388	5GA-T56	
C74	.0033	400	110715	P488-0033	D6-332	CUB4D33	GP3-333-322	PT4333	4TM-D33	
C75	.01	400	110718	P488-01	D6-103	CUB4S1	GP3-333-103	PT401	4TM-S1	
C76	.5000		110586	BPD-005	DD-502	K080	811-005	DC-535	5HK-D5	
C77	.0047	500	110719	P488-0047	D6-472	CUB5D47	GP3-333-472	PT5247	5TM-D47	
C78	.01	600	110727	P488-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C79	.01	600	110727	P488-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C80	.047	200	110703	P283-047	DF-503	CUB4S47		PT4147	4TM-S47	
C81	.047		110722	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C82	100		110460	SI100	D5-101	TP33	GP1K-101	UC-531	5GA-T1	
C83	.1	400	110734	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C84	.01	400	110718	P488-01	D6-103	CUB4S1	GP3-333-103	PT401	4TM-S1	
C85A	.0022							PT6223		
B	.0047		s2B2309	4PA-I10	4PC-100	s1S7M1	s1406-01	PT6247	s10IC1	
C	.0047							PT6247		
C86	.01	400	110718	P488-01	D6-103	CUB4S1	GP3-333-103	PT401	4TM-S1	
C87	.22	600	110748	294-25		CUB6P25		PT6025	6TM-P25	
C88	.047	600	110741	P488-047		CUB6S47		PT6147	6TM-S47	
C89	.1	600	110743	P488-1	DF-104	CUB6P1		PT601	6TM-P1	
C90	.1	600	110743	P488-1	DF-104	CUB6P1		PT601	6TM-P1	
C91	.1	600	110743	P488-1	DF-104	CUB6P1		PT601	6TM-P1	
C92	.1	400	110734	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C93	.001	400	110634	P488-001	D6-102	CUB4D1	GP2L-102	PT431	4TM-D1	
C94	.001	400	110634	P488-001	D6-102	CUB4D1	GP2L-102	PT431	4TM-D1	
C95	.0047	400	110716	P488-0047	D6-472	CUB4D47	GP3-333-472	PT4247	4TM-D47	
C96	.047	400	110723	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C97	3900	500	110500	1464-004		1R3D39		MCB3463	MB-34	
C98	390	500	110263	1469-0004		SR5T39		MCB3343	MB-34	
C99	390	500	110263	1469-0004		SR5T39		MCB345	MB-35	
C100	270	500	110260			SR5T27				
C101	.01	600	110737	P488-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C102	220	500	110297			ER5T22				
C103	.1	400	110734	P488-1		CUB4P1		PT401	4TM-P1	
C104	.033	400	110731	P488-033		PM4S33		PT4133		
C105	.068	400	110733	P488-068		CUB4S68			4TM-S68	
C106	.068	1000	110673	P1088-068						
C107	.001	1000	110662	P1088-001		CUB1D1		PT621	MB-D1	
C108	5	7000	110819						75GA-Q56	
C109	330		110454	5U330	D6-331	TP43	GP2K-331	UC-5333	5GA-T33	
C110	.047	600	110741	P488-047	DF-503	CUB6S47		PT6147	6TM-S47	
C111	.068	400	110733	P488-068		CUB4S37			4TM-S68	
C112	500	30000	110821	HV20C	TV3-502	MGMU-20TS	413	HV30035A	30DK-T5	
C113	.01	1000	110668	P1088-01		CUB1S01		PT1621	MB-S1	
C114	.01	1000	110668	P1088-01		CUB1S1		PT1621	MB-S1	
C115	56	1500	110286							
C116	100	500	110291	1469-0001		SR5T1			MB-31	

* Items C84A, C85B, C85C, R88A, R88B, R88C are combined in one unit.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	Stromberg-Carlson PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	145148					Tone (Panel)
B	250KΩ	½	Not Req.					Volume & Switch (Rear) Note 1.
R2A	50KΩ	½	145146	* QT-429	RTV-299		UF54L ⟊†	Horiz. Hold (Panel)
B	1.5Meg	½	Not Req.				UH6L ⟊††	Vert. Hold (Rear)
R3A	1000Ω	2	145140	* QJ-289	RTV-237		WF13 ⟊††	Contrast (Panel)
B	100KΩ	½	Not Req.				UR15L ⟊	Brightness (Rear)
R4A	500KΩ	½	145147	QU-133	AG-58-S	AB-59	SU-50	AGC Note 2
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-1	Not Req.	Attach to R4A
R5A	500KΩ	½	145147	QU-133	AG-58-S	AB-59	SU-50	Noise cancellation
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-1	Not Req.	Attach to R5A
R6A	40KΩ	½	145150	■ QU-133	AG-43-S	AB-32		Horiz. Drive
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-1		Attach to R6A
R7A	6 Meg	½	145100	QU-142	AG-85-S	AB-89	U-82	Vert. Size
B	Shaft		Not Req.	HQ	FK8-1/4	AK-1	Not Req.	Attach to R7A
R8A	50000Ω	½	145079	QU-114	AG-19-S	AB-10	SU-14	Vert. Linearity
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-1	Not Req.	Attach to R8A

* CONCENTRIKIT EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS BU-133 & P1-113 (Panel) BU-139 & R2-131 (Rear).

◆ CONCENTRIKIT EQUIVALENT KIT K-3 BASE ELEMENTS & SHAFTS WU-108 & P3-111 (Panel) BU-138 & R2-131 (Rear).

† Universal replacement (Mallory exact duplicate Part No. UR100S).

†† Universal replacement (Mallory exact duplicate Part No. UE28W).

Note 1. One pole on the switch will open when the other pole is closed.

Note 2. Not used in all models.

■ Connect a 220KΩ resistor across this control.

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	Stromberg-Carlson PART No.	IRC PART No.	NOTES
R9	15KΩ	½	28172	BTS-15K	
R10	22000Ω	2	149048	BTB-2200	
R11	15KΩ	½	28172	BTS-15K	
R12	1 Meg 5%	½	171297	BTS-1 Meg 5%	
R13	470Ω	½	28154	BTS-47B	
R14	750KΩ	½	149315	BTS-750K	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	Stromberg-Carlson PART No.	IRC PART No.	NOTES
R15	1000Ω	½	28158	BTS-1000	
R16	3900Ω	½	28165	BTS-3900	
R17	220KΩ	½	28163	BTS-220K	
R18	2200Ω	½	28162	BTS-2200	
R19	1000Ω	½	28158	BTS-1000	
R20	15KΩ	½	28172	BTS-15K	
R21	220Ω	½	28150	BTS-220	
R22	4700Ω	½	28166	BTS-4700	
R23	1000Ω	½	28158	BTS-1000	
R24	4.7Ω	½	149282		
R25	220KΩ	½	149115	BTS-220K	
R26	22KΩ	½		BTS-22K	Note 1
R27	47Ω	½	28143	BTS-47	
R28	2200Ω	½	149103	BTS-2200	
R29	120Ω	½	28159	BTS-120	
R30	24KΩ 5%	½	171238	BTS-24K 5%	
R31	2200Ω	½	149103	BTS-2200	
R32	330KΩ	½	149344	BTS-330K	
R33	47Ω	½	28143	BTS-47	
R34	1200Ω	½	28169	BTS-1200	
R35	10KΩ	½	28170	BTS-10K	
R36	82Ω	½	28145	BTS-82	
R37	1200Ω	½	28169	BTS-1200	
R38	3300Ω	½	28164	BTS-3300	
R39	2200Ω	½	28162	BTS-2200	
R40	33KΩ	½	149404	BTA-33K	
R41	33KΩ	2	149012	BTB-33K	
R42	2200Ω	2	28162	BTB-2200	
R43	2200Ω	2		BTB-2200	
R44	2200Ω	2		BTB-2200	
R45	470KΩ	½	149117	BTS-470K	
R46	220Ω	1	149134	BTA-220	
R47	680Ω	2	149075	BTB-680	
R48	22KΩ	½	149109	BTS-22K	
R49	68Ω	½	149094	BTS-68	
R50	2000Ω	7	149411		
R51	1 Meg	½	149119	BTS-1 Meg	
R52	270KΩ	½	28184	BTS-270K	
R53	680KΩ	½	28189	BTS-680K	
R54	22KΩ	½	149354	BTS-22K	
R55	470KΩ	½	28187	BTS-470K	
R56	47KΩ	½	149111	BTS-47K	
R57	27KΩ	½	149403	BTA-27K	
R58	100KΩ	½	149113	BTS-100K	
R59	68Ω	½	149094	BTS-68	
R60	47Ω	½	149093	BTS-47	
R61	220Ω	½	149097	BTS-220	
R62	15KΩ	½	149108	BTS-15K	
R63	4700Ω	½	149143	BTA-4700	
R64	220Ω	½	149097	BTS-220	
R65	18KΩ	½	28173	BTS-18K	
R66	47KΩ	½	149111	BTS-47K	
R67	10 Meg	½	149125	BTS-10 Meg	
R68	470KΩ	½	149117	BTS-470K	
R69	470KΩ	½	149117	BTS-470K	
R70	270Ω	2	149014		
R71	68Ω	½	149094	BTS-68	
R72	1250Ω	5	149430	1 3/4A-1250	

ITEM No.	RATING OHMS	RATING WATT	Stromberg-Carlson PART No.	IRC PART No.	NOTES
R73	1.5 Meg	½	149120	BTS-1.5Meg	
R74	18KΩ	½	28173	BTS-18K	
R75	18KΩ	½	28173	BTS-18K	
R76	2.2Meg	½	149121	BTS-2.2Meg	
R77	1 Meg	½	149119	BTS-1 Meg	
R78	68KΩ	½	28179	BTS-68K	
R79	33KΩ	½	28175	BTS-33K	
R80	150KΩ	½	149014	BTS-150K	
R81	330KΩ	½	28185	BTS-330K	
R82	2.2Meg	½	149121	BTS-2.2Meg	
R83	2200Ω	½	28163	BTS-2200	
R84	1000Ω	½	28158	BTS-1000	
R85	2200Ω	½	28163	BTS-2200	
R86	390KΩ	½	28186	BTS-390K	
R87	100KΩ	½	149113	BTS-100K	
R88A	22KΩ	½		BTS-22K	
B	82000Ω	½	▸128300	BTS-8200	
C	82000Ω	½		BTS-8200	
R89	820KΩ	½	28190	BTS-820K	
R90	10KΩ	½	149107	BTS-10K	
R91	1 Meg	½	28181	BTS-1 Meg	
R92	6800Ω	½	28168	BTS-6800	
R93	470Ω	½	149156	BTA-470	
R94	2.2Meg	½	149121	BTS-2.2Meg	
R95	220KΩ	½	149115	BTS-220K	
R96	22000Ω	2	149078	BTB-2200	
R97	22000Ω	2	149078	BTB-2200	
R98	270KΩ	½	28184	BTS-270K	
R99	270KΩ	½	28184	BTS-270K	
R100	10KΩ	½	149107	BTS-10K	
R101	1000Ω	½	149101	BTS-1000	
R102	560Ω	½	28155	BTS-560	
R103	560Ω	½	28155	BTS-560	
R104	100KΩ	½	149385	BTS-100K	
R105	100KΩ	½	149385	BTS-100K	
R106	470KΩ	½	149117	BTS-470K	
R107	680KΩ	½	28189	BTS-680K	
R108	4.7MegΩ	½	149123	BTS-4.7Meg	
R109	15000Ω 5%	½	149387	BTS-1500 5%	
R110	5600Ω	½	149184	BTA-5600	
R111	130KΩ	½	28181	BTS-130K	
R112	130KΩ	½	28181	BTS-130K	
R113	68KΩ	½	28179	BTS-68K	
R114	5600Ω	½	28187	BTS-5600	
R115	68Ω	½	149094	BTS-68	
R116	47KΩ	½	149111	BTS-47K	
R117	100Ω	2	149070		
R118	68Ω	2	149094	BTS-68	Note 3
R119	15KΩ	½	33912	1 3/4A-15K	
R120	2200Ω	½	149103	BTS-2200	
R121	1800Ω	½	28161	BTS-1800	
R122	3.5Ω	½	149419		
R123	33Ω	½	149161		
R124	100KΩ	½	149113	BTS-100K	
R125	2200Ω	35	149433		
R126	150KΩ	½		BTS-150K	Note 2

Note 1. Some models may use a 15KΩ resistor in this application.
Note 2. Not used in all models.
Note 3. R118 used in series 622 only.
◆ Items R88A, R88B, R88C, C85A, C85B, C85C, are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC 1	RATING SEC 2	Stromberg-Carlson PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC	590VCT .310ADC ② 6A	5VAC	161445	P-8338 ①	P-3055				
	② 2.3A	SEC. 3	SEC. 4 SEC. 5							
		6.3VAC ② .86A	6.3VAC ② 10A							

① Drill new mounting holes.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	Stromberg-Carlson PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.
T2	Vert. Osc. Trans.	161254	A-8125	A-3003	A-97X	209T1⑤	H6702
T3	Horiz.Output Trans.	161046		HVO-8①	D-22 ③	225T1 ③	FB41 ①
T4	Vert.Output Trans.	161252	A-8123	A-3037	A-102X	222T1	Z1804
T5A	Yoke-Horiz.(24MH)	114741	DY-8A	MDF-72	Y-17	21D2	DF502
B	Yoke-Vert. (40MH)						
T6	Horiz.Lin.Coil (1.2-4.3MH tapped)	114084	WC-8	MWC-5③		209R1	
T7	Width Coil (.5-3MH)	114083	WC-7	MWC-2③	WC-12 ④		

① Connect original terminal #9 to new terminal #9, remove linearity coil from cathode of damper (V20) & connect in plate circuit as shown on instruction sheet packed with unit, leaving center tap disconnected C1 & C2 of instruction sheet may be chosen from C103, C104 & C111 of original circuit depending upon which combination gives the best linearity. (on the HVO-9 instruction sheet, these capacitors do not have item numbers, but are shown at each end of the linearity coil). Connect cathode of damper (V20) thru L41 to terminal #9. Connect original terminal #5 to new terminal #5, original terminal #4 to new terminal #4. Connect width coil across terminals #4 and "T". Connect yoke return thru C105 to terminal #3. Connect R121 and C109 across terminal #3 and #1 as in original circuit.
② Connect as in original circuit except, connect original terminal #4 to new terminal "T".
③ Enlarge mounting hole.
④ Connect to coded blue and green terminals.
⑤ Drill one new mounting hole.
⑥ Connect as in original circuit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	Stromberg-Carlson PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T8	6.2KΩ	3.1Ω	161259	A-3823 ①	A-3020①	S-7X	Z1001	TS-24S80	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V C IMP	Stromberg-Carlson PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	8"	PM	3.1Ω	155734	ST-115 Mod. P8-U	8A21	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	Stromberg-Carlson PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	UHF Ant. Coupling loop	0Ω		171800				
L2	UHF Ant. Coil	0ΩCT		171801				
L3	UHF RF Coil	0ΩCT		171802				
L4	Fil. Choke	0Ω		171803				
L5	Fil. Choke	0Ω		171804				
L6	Osc. coupling primary	0ΩCT (Tapped)		171808				
L7	Osc. coupling secondary	0Ω		171805				
L8	RF Choke	.9Ω		171806				
L9	UHF IF Output Coil	.1ΩCT		171807				
L10	UHF IF Coil	0Ω		171272				
L11	VHF Ant. Trans.	0ΩCT	0Ω	171276				Low channel secondary-0Ω Channels 2-13
L12	VHF Ant. Coil	0Ω		171809-171830				Channel 13
L13	VHF Ant. Coil	0Ω		171292				
L14	Neutr. Coil	0Ω		171273				Channel 13
L15	VHF RF Coil	0Ω		171293				Channel 13
L16	VHF RF Coils	0Ω		171484-171497				Channel 13
L17	Mixer grid coil	0Ω		171294				Channel 13
L18	Mixer grid coils	0Ω		171586-171597				Channels 2-13
L19	Fil. Choke	0Ω		171275				
L20	Osc. Plate coil	0ΩCT		171295				Channel 13
L21	Osc. Coils	0Ω		171353-171263				Channel 2-13
L22	Osc. Coil	0Ω		171296				Channel 6
L23	UHF IF Coil	0Ω		171271				
L24	Conv. Plate	.1Ω		171344				
L25	1st Video IF grid	1.2Ω		171346				Includes trap (1.4Ω)
L26	1st Video IF plate	1.4Ω		171347				
L27	2nd Video IF grid	1.2Ω		171348				
L28A	41.25MC Trap	1.5Ω		171349				
B	47.25MC Trap	1.5Ω						
L29	3rd Video IF	1.8Ω	1.3Ω	171350				
L30	4th Video IF	2Ω	1.9Ω	171351				
L31	Series Peaking coil	1.6Ω		114747	19-1005		4612	10 Microhenries
L32	Series Peaking coil	8Ω		114749	19-3075	TV-1H	4672	81 Microhenries
L33	Shunt Peaking coil	11Ω		114748	19-3250 ▲	TV-1B6 ▲	6181 ▲	250 Microhenries; wound on 2.2KΩ resistor. Note 1.
L34	Series Peaking coil	11Ω		114750	19-3250	TV-1B6	6181	250 Microhenries
L35	Shunt Peaking coil	11Ω		114751	19-3250 †	TV-1B5 †	6181 †	250 Microhenries; wound on 3.3KΩ resistor. Note 2
L36	4.5MC Trap	1.7Ω		114415	20-1004	TV-151	1470	
L37	1st Sound IF	2.7Ω		114400			1470-A	
L38	2nd Sound IF	2.2Ω	2.2Ω	114401	19-3445	TV-113	6203	
L39	Ratio Det.	6.5Ω	1.8ΩCT	114375	17-3497	TV-115	6205	Tertiary windings. 4Ω
L40	Horiz. Osc.	110Ω		114133	19-1078	TV-163	6210	
L41	RF Choke	1.8Ω		114693	19-1002		4606	
								2.2 Microhenries; IRC Part # CLA

Note 1. Some models may use L33 with no shunting resistor.
Note 2. Some models may use L35 with no shunting resistor.
† Parallel with 3.3KΩ resistor.
▲ Parallel with 3.3KΩ resistor.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ~)	Stromberg-Carlson PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L42	.310A	65Ω	2HY	161030	C-2334 ①		C-17X	C5037①	T-26C44①

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	Stromberg-Carlson PART No. FUSE	Stromberg-Carlson PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG SB	5A 125V	128007	128008	313005. (3AG S/B-5A)	342001	MDX5	HKP
M2	3AG	1/4A	128003	128006	312. 250 (3AG-1/4A)	357001	AGC 1/4	4405

STROMBERG-CARLSON
MODELS 621A Series, 622 Series

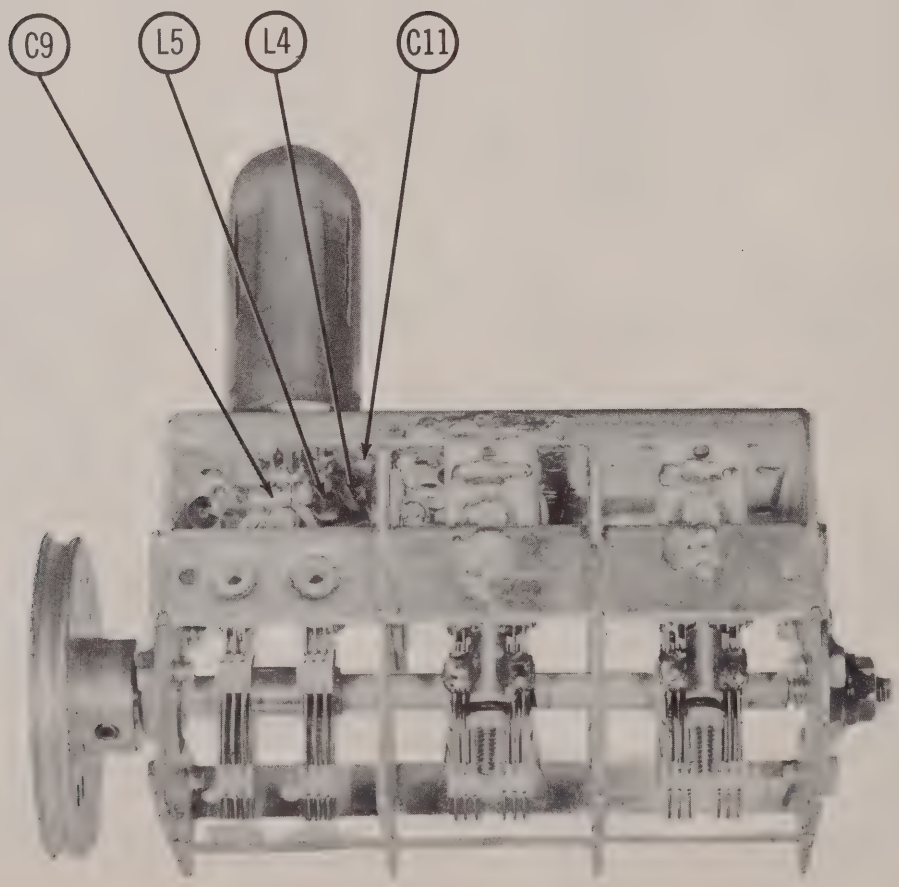
PARTS LIST AND DESCRIPTIONS (Continued)

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		Stromberg-Carlson PART No.	SYLVANIA PART No.		
M3	K-3	171252	1N82 or A		UHF Mixer (clip-in)
M4	1N64	162157	1N132		Video Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	Stromberg-Carlson PART No.	NOTES
M5	Dial Light	29956	#44 Bayonet - UHF Dial
M6	Tuner	164024	UHF-622 Series
M7A	Tuner	164023	VHF-622 Series
B	Tuner	164022	VHF-621A Series
M8	Switch	158037	TV-Phono (DPDT slide)
M9	Centering Magnet	114117	
M10	Ion Trap	114645	
	Cabinet	108306	Models 621ATM, 622TM
	Cabinet	108307	Models 621ATO, 622TO
	Cabinet	108304	Models 621ACM, 622CM
	Cabinet	108305	Models 621ACO, 621CO
	Cabinet	108302	Models 621ACDM, 622CDM
	Cabinet	108303	Models 621ACDO, 622CDO
	Cabinet	108310	Models 621AC5E, 622C5E
	Cabinet	108308	Models 621AC5M, 622C5M
	Cabinet	108309	Models 621AC5O, 622C5O
	Cabinet	108330	Models 621AC 5I , 622C5I
	Cabinet	108329	Models 621AC5R, 622C5R
	Knob	134195	Tuning (Brown)
	Knob	134197	Channel Selector - 622 Series (Brown)
	Knob	134198	Channel Selector - 621A Series (Brown)
	Knob	134196	Tone (Brown)
	Knob	134199	Volume (Brown)
	Knob	134202	Outer (Brown)
	Knob	134201	Inner (Brown
	Knob	134205	Channel Indicator (Yellow)
	Knob	134208	Channel Selector (Black)
	Knob	134207	Volume (Yellow)
	Knob	134210	Volume (Black)
	Knob	134204	Outer (yellow)
	Knob	134212	Outer (Black)
	Knob	134203	Inner (Yellow)
	Knob	134211	Inner (Black)
	Dial	122041	UHF
	Safety Glass	138037	



UHF TUNER

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L F FRANKENSHIP
3924 MEADE ST
DENVER, COLORADO

POWER

DEAD SET

If filaments fail to light, check fuse M1, AC interlock assembly, switch on volume control and T1. If filaments light, substitute V22 and V23. Check B+ filter and decoupling components.

SMALL AND/OR DIM PIX

Substitute V22 and V23. Check B+ filter and decoupling network components.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check fuse M2. Check by substitution V18, V19, V20 and V21. Check waveform W19.

If Satisfactory	If Unsatisfactory
Check C112, R122, R119, T3, T5A and other associated components.	Check R5A, C101, C98, C99 and other associated circuit components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V18, V19, V20, V21, V22 and V23. Check picture tube. Proceed as outlined under "Loss Of High Voltage".

BLOOMING

Check by substitution V18, V19, V20 and V21. Check C112, R122, T3, T5A, picture tube and other associated circuit components.

GENERAL

RASTER SOUND NO PIX

Follow procedure outlined under "Loss Of Video".

RASTER PIX NO SOUND

Follow procedure outlined under "Weak Or No Sound".

RASTER NO SOUND NO PIX

Check by substitution V2, V3, V4, V5, and V6. Check associated circuit components especially video IF B+ decoupling network components. In case of UHF check V1.

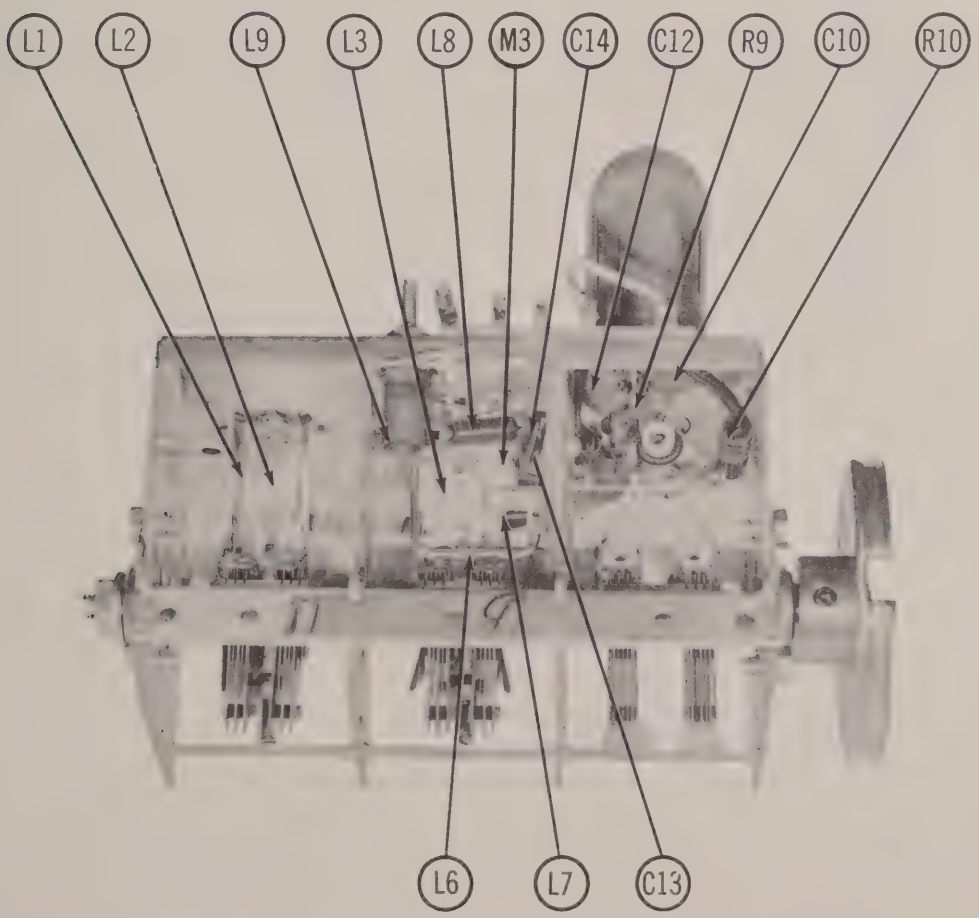
NO RASTER NO SOUND

Follow procedure outlined under "Dead Set".

INTERMITTENT STREAKS

Check video signal for interfernece pulses. Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



UHF TUNER

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the RF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove two wood screws holding metal bracket at the front top of cabinet. Remove metal bracket and lift safety glass up and out. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

REAR PANEL SERVICE CONTROLS

SPECIAL ADJUSTMENTS - NOISE CANCELLATION CONTROL

All necessary horizontal sweep circuit adjustments should be made before adjustment of noise cancellation control. Tune to strongest available TV signal. Starting with control in extreme counter clockwise position turn control clockwise until picture starts to distort or lose sync, then back off the control until the picture is stable and undistorted.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontal hold control at the mid-position of its range and adjust the horizontal oscillator slug (L40) until the picture synchronizes horizontally. If synchronization cannot be obtained by the above adjustment see Horiz. Sweep Circuit Adjustments on page 11.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L39) located on top of chassis. See tube placement chart).

FUSES

Two fuses are used. One for horizontal sweep circuit protection and one for LV power supply protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

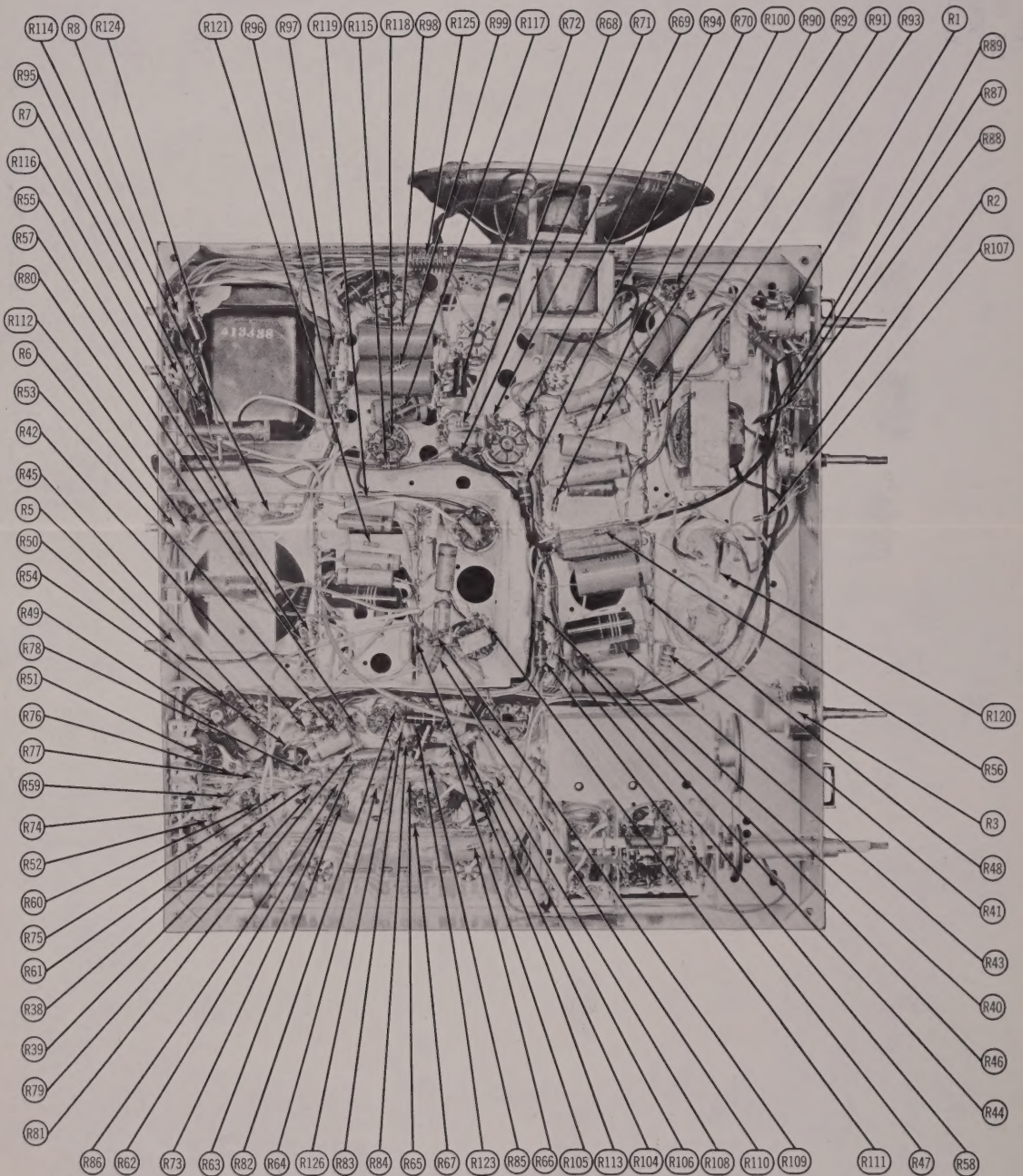
Remove 9 push on type control knobs from front panel.

Disconnect transmission lines and built-in antenna.

Remove 11 wood and 1 metal screws. Remove rear cover.

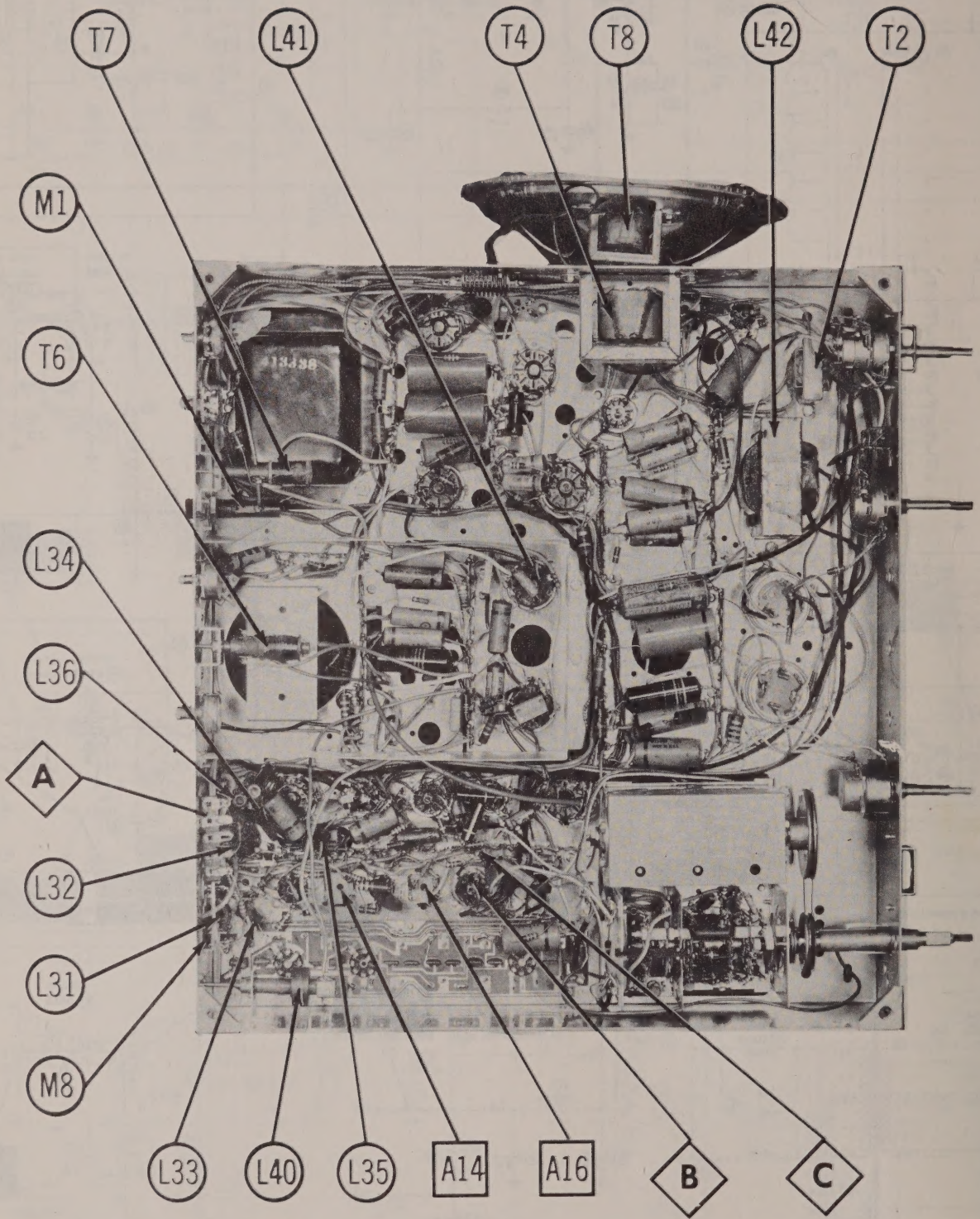
Remove 4 chassis bolts. Remove chassis.

NOTE : Speaker is fastened to chassis and is removed when chassis is removed.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION